

## INFORMATION PROCESSOR, ITS METHOD, AND STORAGE MEDIUM

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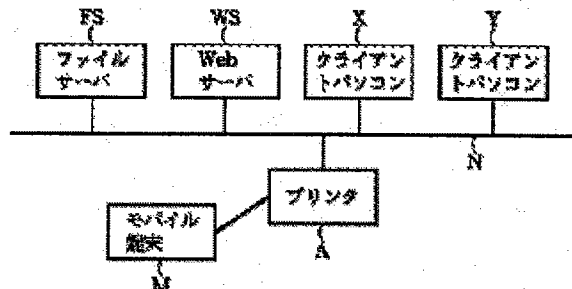
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### Abstract of JP2001344232

**PROBLEM TO BE SOLVED:** To generate a document file laid out suitably to an output area to a printer from a document file consisting of plural blocks having respectively different attributes and not regulated as to layout. **SOLUTION:** A client personal computer (PC) X analyzes the elements of a block for every attribute, transforms the format of text data in a document file into the format of a printable layout type document file as a character size more than a previously set minimum character size and allocates a suitable area and the character size on the basis of data corresponding to each attribute of a document specified by relative coordinates and the size of outputting paper of a printer A.



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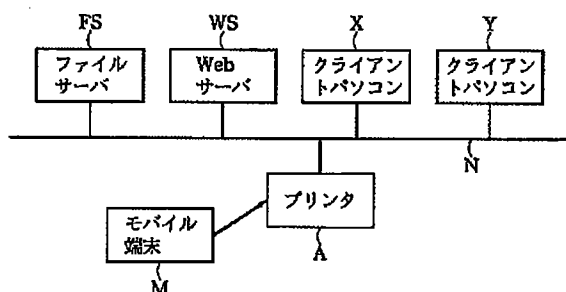
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(54) 【発明の名称】 情報処理装置および情報処理方法および記憶媒体

(57) 【要約】

【課題】 レイアウトが規定されない属性の異なる複数のブロックからなるドキュメントファイルから印刷装置に対する出力領域に適したレイアウトがなされたドキュメントファイルを生成することである。

【解決手段】 クライアントパソコンXがブロックの要素を各属性毎に解析して、ドキュメントファイル中のテキストデータがあらかじめ設定される最小文字サイズ以上の文字サイズとして印刷可能なレイアウト形式のドキュメントファイルにフォーマット変換して、相対座標で指定されているドキュメントの各属性に従うデータとプリンタAの出力用紙のサイズとに基づき、適切な領域の割り当ておよび文字のサイズの割り当てを行なう構成を特徴とする。



## 【特許請求の範囲】

【請求項1】 レイアウトが規定されない属性の異なる複数のブロックからなるドキュメントファイル进行处理可能な情報処理装置であって、前記各ブロックの要素を各属性毎に解析して、前記ドキュメントファイル中のテキストデータがあらかじめ設定される最小文字サイズ以上の文字サイズで印刷するように各ブロックの要素を印刷装置の用紙サイズで決定される複数の出力領域に配置する配置手段を有することを特徴とする情報処理装置。

【請求項2】 前記配置手段は、前記ドキュメントファイルに対する出力用紙サイズを設定する設定手段と、前記設定手段により設定された出力用紙サイズに基づいて、各ブロックのサイズを決定する決定手段と、前記決定手段によって決定された各ブロックのサイズに基づいて出力領域と文字サイズの拡大縮小率を求める倍率決定手段と、前記倍率決定手段により求められる拡大縮小率に基づいて、各ブロックの文字サイズを計算する計算手段と、全てのブロックに対して前記計算手段によりフォントサイズを求め、最小のフォントサイズがあらかじめ設定されたフォントサイズより大きいかなかを判定する判定手段と、前記判定手段により最小のフォントサイズがあらかじめ設定されたフォントサイズより小さいと判定した場合には、あらかじめ設定された最小のフォントサイズまで各ブロックのサイズを拡大する拡大手段と、を有することを特徴とする請求項1記載の情報処理装置。

【請求項3】 前記属性は、テキスト、イメージ、テーブルを含むことを特徴とする請求項1記載の情報処理装置。

【請求項4】 前記最小のフォントサイズは、任意のサイズを設定可能とすることを特徴とする請求項2記載の情報処理装置。

【請求項5】 前記ドキュメントファイルは、HTML形式、XML形式、HTML形式またはXML形式の拡張形式を含むことを特徴とする請求項1または2記載の情報処理装置。

【請求項6】 レイアウトが規定されない属性の異なる複数のブロックからなるドキュメントファイル进行处理可能な情報処理装置における情報処理方法であって、前記各ブロックの要素を各属性毎に解析して、前記ドキュメントファイル中のテキストデータがあらかじめ設定される最小文字サイズ以上の文字サイズで印刷するように各ブロックの要素を印刷装置の用紙サイズで決定される複数の出力領域に配置する配置工程を有することを特徴とする情報処理方法。

【請求項7】 前記配置工程は、前記ドキュメントファイルに対する出力用紙サイズを設

定する設定工程と、

前記設定工程により設定された出力用紙サイズに基づいて、各ブロックのサイズを決定する決定工程と、前記決定工程によって決定された各ブロックのサイズに基づいて出力領域と文字サイズの拡大縮小率を求める倍率決定工程と、

前記倍率決定工程により求められる拡大縮小率に基づいて、各ブロックの文字サイズを計算する計算工程と、全てのブロックに対して前記計算工程によりフォントサイズを求め、最小のフォントサイズがあらかじめ設定されたフォントサイズより大きいかなかを判定する判定工程と、

前記判定工程により最小のフォントサイズがあらかじめ設定されたフォントサイズより小さいと判定した場合には、あらかじめ設定された最小のフォントサイズまで各ブロックのサイズを拡大する拡大工程と、を有することを特徴とする請求項6記載の情報処理方法。

【請求項8】 前記属性は、テキスト、イメージ、テーブルを含むことを特徴とする請求項6記載の情報処理方法。

【請求項9】 前記最小のフォントサイズは、任意のサイズを設定可能とすることを特徴とする請求項7記載の情報処理方法。

【請求項10】 前記ドキュメントファイルは、HTML形式、XML形式、HTML形式またはXML形式の拡張形式を含むことを特徴とする請求項6または7記載の情報処理方法。

【請求項11】 レイアウトが規定されない属性の異なる複数のブロックからなるドキュメントファイル进行处理可能な情報処理装置に、前記各ブロックの要素を各属性毎に解析して、前記ドキュメントファイル中のテキストデータがあらかじめ設定される最小文字サイズ以上の文字サイズで印刷するように各ブロックの要素を印刷装置の用紙サイズで決定される複数の出力領域に配置する配置工程を実行させるためのプログラムを記録したコンピュータが読み取り可能な記憶媒体。

【請求項12】 前記配置工程は、前記ドキュメントファイルに対する出力用紙サイズを設定する設定工程と、

前記設定工程により設定された出力用紙サイズに基づいて、各ブロックのサイズを決定する決定工程と、前記決定工程によって決定された各ブロックのサイズに基づいて出力領域と文字サイズの拡大縮小率を求める倍率決定工程と、

前記倍率決定工程により求められる拡大縮小率に基づいて、各ブロックの文字サイズを計算する計算工程と、全てのブロックに対して前記計算工程によりフォントサイズを求め、最小のフォントサイズがあらかじめ設定されたフォントサイズより大きいかなかを判定する判定工程と、

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前記判定工程により最小のフォントサイズがあらかじめ設定されたフォントサイズより小さいと判定した場合には、あらかじめ設定された最小のフォントサイズまで各ブロックのサイズを拡大する拡大工程とを有することを特徴とする請求項 11 記載の記憶媒体。

【請求項 13】 前記属性は、テキスト、イメージ、テーブルを含むことを特徴とする請求項 11 記載の記憶媒体。

【請求項 14】 前記最小のフォントサイズは、任意のサイズを設定可能とすることを特徴とする請求項 12 記載の記憶媒体。

【請求項 15】 前記ドキュメントファイルは、HTML 形式、XML 形式、HTML 形式または XML 形式の拡張形式を含むことを特徴とする請求項 11 または 12 記載の記憶媒体。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、レイアウトが規定されない属性の異なる複数のブロックからなるドキュメントファイル処理可能な情報処理装置および情報処理方法および記憶媒体に関するものである。

【0002】

【従来の技術】 近年、インターネット等の通信メディアの普及に伴い、パーソナルコンピュータ等の情報処理装置からネットワーク上の Web にアクセスして、種々のホームページの情報を閲覧し、所望とする情報をダウンロードして、種々のプリンタから印刷する機会が増大している。

【0003】 この際、Web の交換文書データとして利用されている HTML (HyperText Markup Language) 形式で記述された文書データ、あるいは今後文書データの標準フォーマットとして期待されている XML (Extensible Markup Language) 形式で記述された文書データをサーバからネットワークにつながったプリンタから印刷することとなる。この場合において、HTML のデータを扱う情報処理装置においては、HTML のデータには出力時の用紙サイズや解像度等は意識せずに作成されている場合が多い。

【0004】 また、HTML ファイルの内容は、ブラウザと称せられる閲覧プログラム、例えばマイクロソフト社製の Internet Explorer やネットスケープ社製の Netscape Navigator 等で領域の大きさが変更された場合に、変更された領域に合わせてレイアウトも変化できるように相対座標値や割合で定義されている場合が多い。

【0005】

【発明が解決しようとする課題】 しかしながら、上記 HTML ファイルをプリンタで印刷しようとした場合に、出力用紙サイズを意識して作成されていない為、期待し

たものと出力のサイズが異なって印刷される等の問題がある。

【0006】 例えば出力用紙の用紙サイズに収まらず、領域をオーバーして印刷されるものや、領域に収めようとすると、文字が小さくなってしまつて読めなくなつてしまふ等の問題点があつた。

【0007】 本発明は、上記の問題点を解決するためになされたもので、ブロックの要素を各属性毎に解析して、ドキュメントファイル中のテキストデータがあらかじめ設定される最小文字サイズ以上の文字サイズとして印刷可能なレイアウト形式のドキュメントファイルにフォーマット変換して、相対座標で指定されているドキュメントの各属性に従うデータと出力用紙のサイズとに基づき、適切な領域の割り当ておよび文字のサイズの割り当てを行なうことにより、レイアウトが規定されない属性の異なる複数のブロックからなるドキュメントファイルから印刷装置に対する出力領域に適したレイアウトを行なわれたドキュメントファイルを生成できる情報処理装置および情報処理方法および記憶媒体を提供することである。

【0008】

【課題を解決するための手段】 本発明に係る第 1 の発明は、レイアウトが規定されない属性の異なる複数のブロックからなるドキュメントファイル処理可能な情報処理装置であつて、前記各ブロックの要素を各属性毎に解析して、前記ドキュメントファイル中のテキストデータがあらかじめ設定される最小文字サイズ以上の文字サイズで印刷するように各ブロックの要素を印刷装置の用紙サイズで決定される複数の出力領域に配置する配置手段 (図 2 に示す CPU 101 によるデータ処理に相当) を有するものである。

【0009】 本発明に係る第 2 の発明は、前記配置手段は、前記ドキュメントファイルに対する出力用紙サイズを設定する設定手段 (図 2 に示す CPU 101 によるデータ処理に相当) と、前記設定手段により設定された出力用紙サイズに基づいて、各ブロックのサイズを決定する決定手段 (図 2 に示す CPU 101 によるデータ処理に相当) と、前記決定手段によって決定された各ブロックのサイズに基づいて出力領域と文字サイズの拡大縮小率を求める倍率決定手段 (図 2 に示す CPU 101 によるデータ処理に相当) と、前記倍率決定手段により求められる拡大縮小率に基づいて、各ブロックの文字サイズを計算する計算手段と、全てのブロックに対して前記計算手段によりフォントサイズを求め、最小のフォントサイズがあらかじめ設定されたフォントサイズより大きいか否かを判定する判定手段 (図 2 に示す CPU 101 によるデータ処理に相当) と、前記判定手段により最小のフォントサイズがあらかじめ設定されたフォントサイズより小さいと判定した場合には、あらかじめ設定された最小のフォントサイズまで各ブロックのサイズを拡大す

る拡大手段（図2に示すCPU101によるデータ処理に相当）とを有するものである。

【0010】本発明に係る第3の発明は、前記属性は、テキスト、イメージ、テーブルを含むものである。

【0011】本発明に係る第4の発明は、前記最小のフォントサイズは、任意のサイズを設定可能とするものである。

【0012】本発明に係る第5の発明は、前記ドキュメントファイルは、HTML形式、XML形式、HTML形式またはXML形式の拡張形式を含むものである。

【0013】本発明に係る第6の発明は、レイアウトが規定されない属性の異なる複数のブロックからなるドキュメントファイル処理可能な情報処理装置における情報処理方法であって、前記各ブロックの要素を各属性毎に解析して、前記ドキュメントファイル中のテキストデータがあらかじめ設定される最小文字サイズ以上の文字サイズで印刷するように各ブロックの要素を印刷装置の用紙サイズで決定される複数の出力領域に配置する配置工程（図9に示すステップ5-1～5-11）を有するものである。

【0014】本発明に係る第7の発明は、前記配置工程は、前記ドキュメントファイルに対する出力用紙サイズを設定する設定工程（図示しない）と、前記設定工程により設定された出力用紙サイズに基づいて、各ブロックのサイズを決定する決定工程（図9に示すステップ5-3）と、前記決定工程によって決定された各ブロックのサイズに基づいて出力領域と文字サイズの拡大縮小率を求める倍率決定工程（図9に示すステップ5-3）と、前記倍率決定工程により求められる拡大縮小率に基づいて、各ブロックの文字サイズを計算する計算工程（図10に示すステップ6-3）と、全てのブロックに対して前記計算工程によりフォントサイズを求め、最小のフォントサイズがあらかじめ設定されたフォントサイズより大きいかなかを判定する判定工程（図11に示すステップ7-3）と、前記判定工程により最小のフォントサイズがあらかじめ設定されたフォントサイズより小さいと判定した場合には、あらかじめ設定された最小のフォントサイズまで各ブロックのサイズを拡大する拡大工程（図11に示すステップ7-5）とを有するものである。

【0015】本発明に係る第8の発明は、前記属性は、テキスト、イメージ、テーブルを含むものである。

【0016】本発明に係る第9の発明は、前記最小のフォントサイズは、任意のサイズを設定可能とするものである。

【0017】本発明に係る第10の発明は、前記ドキュメントファイルは、HTML形式、XML形式、HTML形式またはXML形式の拡張形式を含むものである。

【0018】本発明に係る第11の発明は、レイアウトが規定されない属性の異なる複数のブロックからなるド

キュメントファイル処理可能な情報処理装置に、前記各ブロックの要素を各属性毎に解析して、前記ドキュメントファイル中のテキストデータがあらかじめ設定される最小文字サイズ以上の文字サイズで印刷するように各ブロックの要素を印刷装置の用紙サイズで決定される複数の出力領域に配置する配置工程を実行させるためのプログラムを記録媒体にコンピュータが読み取り可能に記録させたものである。

【0019】本発明に係る第12の発明は、前記配置工程は、前記ドキュメントファイルに対する出力用紙サイズを設定する設定工程（図示しない）と、前記設定工程により設定された出力用紙サイズに基づいて、各ブロックのサイズを決定する決定工程（図9に示すステップ5-3）と、前記決定工程によって決定された各ブロックのサイズに基づいて出力領域と文字サイズの拡大縮小率を求める倍率決定工程（図9に示すステップ5-3）と、前記倍率決定工程により求められる拡大縮小率に基づいて、各ブロックの文字サイズを計算する計算工程

（図10に示すステップ6-3）と、全てのブロックに対して前記計算工程によりフォントサイズを求め、最小のフォントサイズがあらかじめ設定されたフォントサイズより大きいかなかを判定する判定工程（図11に示すステップ7-3）と、前記判定工程により最小のフォントサイズがあらかじめ設定されたフォントサイズより小さいと判定した場合には、あらかじめ設定された最小のフォントサイズまで各ブロックのサイズを拡大する拡大工程（図11に示すステップ7-5）とを有するものである。

【0020】本発明に係る第13の発明は、前記属性は、テキスト、イメージ、テーブルを含むものである。

【0021】本発明に係る第14の発明は、前記最小のフォントサイズは、任意のサイズを設定可能とするものである。

【0022】本発明に係る第15の発明は、前記ドキュメントファイルは、HTML形式、XML形式、HTML形式またはXML形式の拡張形式を含むを実行させるものである。

【0023】

【発明の実施の形態】図1は、本発明の情報処理装置を適用可能な文書印刷システムの構成を説明する図である。

【0024】図1において、本システムは、複数台のパーソナルコンピュータ（以下、クライアントパソコンという）X、Yと、1台のファイルサーバFSと、1台のWebサーバWSと、少なくとも1台のXMLデータを処理できるプリンタAが、ネットワークNにより接続された構成となっている。

【0025】そして、携帯情報端末のようなモバイル端末MがプリンタAに直接IrDA、RS-232Cやセントロニクスなどを通してネットワークに接続すること

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なくプリンタAと通信可能につながっている。

【0026】なお、クライアントパソコンX、Yの代わりに、ワードプロセッサ、ワークステーション、携帯情報端末等の情報処理装置を接続することも可能である。また、クライアントパソコンX、YおよびファイルサーバFSは、複数種のフォントにかかるフォントデータ群やWebのデータや画像データ等が格納されている。

【0027】本システムでは、モバイル端末MあるいはクライアントパソコンXまたはYからプリンタAに対して印刷したいwebのURLや印刷部数等の印刷要求を出し、プリンタAからWebサーバWSにファイル要求を出し、WebサーバWSは必要な文書データやフォントデータ等をファイルサーバFSより集めて、プリンタAに転送し、プリンタAはその転送されたデータを展開することによって印刷する。

【0028】図2は、図1に示したクライアントパソコンX、Y及びファイルサーバFS及びWebサーバWSの概略構成を示すブロック図である。

【0029】図2において、101はCPU、すなわち中央処理装置であり、この装置全体の制御及び演算処理等を行う。102はROMであり、システム起動プログラムおよび文字変換用の文字パターンデータ等を記憶する。103はRAMであり、CPU101の演算に使用するデータ、CPU101の演算結果を一時記憶する。

【0030】104はキーボード制御部(KBC)であり、キーボード(KB)105よりキー入力データ(文字コードや制御コード)を受け取りCPU101へ伝達する。106はディスプレイ制御部(CRTC)であり、RAM103に格納された表示情報、すなわち、文字コードから変換されたビットマップイメージを読み出し、CRT107に転送する。なお、CRT107は、CRTC106よりビットマップイメージを受け取り表示画面に表示する。

【0031】108はディスク制御部(DKC)であり、外部記憶装置109のデータ伝送等の制御を行う。109は外部記憶装置で、FDすなわちフロッピー(登録商標)ディスク装置、あるいはHDすなわちハードディスク装置、あるいはCD-ROM等で構成される。外部記憶装置109にはプログラムおよびデータを記憶させておき、CPU101は必要に応じて記憶データを参照したり、またはRAM103にロードする。

【0032】110はネットワーク制御部(NTC)であり、ネットワーク装置(NT)111の通信動作制御を行う。112はシステムバスであり、上述の構成要素間のデータ転送を行う。

【0033】図3は、図2に示したRAM103のメモリマップの一例を示す図であり、図1に示したシステム構成におけるメモリマップに対応する。

【0034】図3において、本装置は、基本I/Oプログラム、ウィンドウシステム等のオペレーティングシ

テム、および本発明の処理となるアプリケーションが実行されることにより動作する。基本I/Oプログラムは、図1に示したROM102に格納されている。オペレーティングシステムは、図1に示した外部記憶装置109に示すハードディスク(HD)に格納されている。そして、電源がONされたときに、基本I/Oプログラム中のIPL(イニシャライズプログラムローディング)機能によりHDからオペレーティングシステムがRAMに読み込まれ、その動作が開始される。

【0035】なお、本発明に係るプログラム及び関連データは、図1に示した外部記憶装置109におけるフロッピーディスク(FD)あるいはCD-ROM等の記憶媒体を介して供給される。そして、FDあるいはCD-ROMからプログラム及び関連データを一旦HDへインストールすることにより、HDからRAM103にロードし実行することが可能となるか、あるいは、HDへインストールせずに直接FDあるいはCD-ROMからRAMロードし実行することも可能である。

【0036】図3において、210は基本I/Oプログラムで、ROM102等よりRAM103にロードされ実行可能となった状態を示す。

【0037】211はウィンドウシステム等のオペレーティングシステムがRAM103にロードされ実行可能となった状態を示す。212は本発明のプログラム等を含むアプリケーションがRAM103にロードされ実行可能となった状態を示す。

【0038】213は関連データで、RAM103にロードされ実行可能となった状態を示し、214は各々のプログラムが使用するワークエリアである。

【0039】なお、基本I/Oプログラムは、ROM102内のシステム起動プログラムによりRAM103に読み込まれる。また、外部記憶装置109としてのフロッピーディスク装置、あるいはCD-ROMからアプリケーションプログラム、及び関連データを一旦、ハードディスク装置へインストールした状態で電源がONされたときに、ハードディスク装置からRAM103にロードすることにより、実行することが可能となる。

【0040】なお、ハードディスク装置へインストールせずに、直接フロッピーディスク装置、或いはCD-ROMからRAM103にロードして実行することも可能である。なお、ファイルサーバFSでは、後述のプリンタ情報テーブルが関連データの領域に形成されている。

【0041】図4は、図1に示したプリンタAの構成を説明するブロック図であり、図2に示した文書処理システムのネットワーク装置111とネットワーク装置を介して通信可能に構成されているものとする。

【0042】なお、本システムにおける出力エンジンは、レーザビームプリンタであってもよいし、バブルジェット(登録商標)プリンタあるいは熱転写等の出力エンジンであってもよい。また、XML形式の文書デー

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タ、図形データ、表形式データ、画像データを印刷処理できる機能を有している。

【0043】図4において、211はCPUであり、この装置全体の制御および演算処理等を行うものである。212はROMであり、CPU211が実行すべきシステム起動プログラムおよび書体別の文字パターンデータ等を記憶している。

【0044】213はRAMであり、使用制限のないデータ記憶領域であり、様々な処理毎に各々のプログラムおよびデータがロードされ実行される領域である。

【0045】215はプリンタコントローラ（PRTC）であり、216はプリンタエンジン（PRT）である。214はシステムバスであり、上述の構成要素間のデータの通路となるべきものである。217はディスクコントローラ（DKC）で、ハードディスク218に対するデータ書き込みアクセスまたはハードディスク218からのデータ読み出しアクセスを制御する。

【0046】219はネットワーク制御部（NTC）であり、ネットワーク装置（NT）220の動作制御を行う。なお、ROM212には、文字パターンデータ（フォントデータ）等が格納されている。そしてRAM213またはHD217には、WebサーバWSへ要求した文書データやイメージデータあるいはフォントデータ等がWebサーバWSからダウンロードされ、格納される。

【0047】CPU211は、WebサーバWSから供給された文書データ、イメージデータあるいはフォントデータを、ROM212内にあるプログラムに従って文字パターンデータや画像データ（ビットマップデータ）を生成して、プリンタコントローラ215内の印刷バッファに展開する。

【0048】プリンタコントローラ215は、ビットマップデータに基づいて生成した印刷コントロール信号をプリンタエンジン216に出力する。ネットワークコントローラ217は、図1に示したネットワークNを介してクライアントパソコンX、YやファイルサーバFSとの間でデータ送受信を行う際のネットワーク装置（NT）218の動作を制御している。

【0049】図5は、本発明に係る情報処理装置におけるドキュメントの変換処理状態を説明するブロック図である。

【0050】本処理の流れは、ホスト側の処理とプリンタ側の処理に分かれていて、ホスト側の処理は、図1に示したWebサーバWS上で行なわれたり、クライアントパソコンXまたはクライアントパソコンYで処理されたりする。

【0051】本処理はまず、例えば図1に示したファイルサーバFSよりXML形式で保存されたドキュメントあるいはHTML形式で保存されたドキュメントを読み込み、それを一旦XHTML（Extensible

Hyper Text Markup Language）の形式のデータに変換する。そして、そこから図9に示すフローチャートに従って出力用紙サイズや解像度にしたがって適切なレイアウトを行なうSVG（Scalable Vector Graphic）に変換を行なう。

【0052】なお、XHTMLおよびSVGの内容については、W3Cのテクニカルレポートに記載されている。基本的にXHTMLは、HTMLの文法をXML形式に従って拡張したものであり、表示処理に適している。

【0053】一方、SVGは、PS（アドビ社製のPost Script）等のページ記述の文法に似たものであり、XML拡張されたものであり、出力フォーマットに適している。したがって、HTMLやXMLの文書データを一旦XHTMLに変換し、さらにそこで出力用紙サイズや解像度を得て、SVG形式のデータに変換し、それをSVGが解釈できるプリンタへSVGファイルで転送するのである。そうすることによって、XMLやHTMLでかかれた文書データを適切にレイアウトして出力することが可能となる。

【0054】図6は、図5に示したXHTML形式のドキュメント例を説明する図であり、図7は、図6に示したXHTML形式のドキュメント例のレイアウト構造を説明する図であり、図8は、図7に示したXHTML形式のドキュメントのSVG変換リスト例を説明する図である。

【0055】次に、図9に示すフローチャートに従って、本発明に係る情報処理装置におけるXHTML形式の文書データからSVG形式の画像等を含む文書データ（ドキュメント）に変換する処理の詳細な流れの説明を行なう。

【0056】図9は、本発明に係る情報処理装置における第1のデータ処理手順の一例を示すフローチャートである。なお、（5-1）～（5-11）は各ステップを示す。

【0057】まず、ステップ（5-1）では、変換元となるXHTML形式のデータの中からまず変換の基準となるフォントサイズを求める。なお、基準となるフォントサイズは、XHTMLのファイルでは、特に指定されていない。

【0058】従って、各ブラウザが独自に基準フォントサイズを定めていることが多いが、ここでは出力用紙への基準フォントサイズとして10ポイントあるいは10.5ポイント等の値を定める。

【0059】また、XHTMLドキュメントの中に基準フォントサイズが記入してあるような場合には、その値を基準フォントサイズとして定める。

【0060】次に、ステップ（5-2）においては、XHTMLドキュメント全体をチェックして、テーブルの

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属性がないかどうかを調べて最大横サイズテーブルを抽出し、テーブルの属性がない場合には、所定の出力したい用紙や画面のサイズの横領域が各XHTML要素であるタグの横領域の基準となるサイズとなる。

【0061】一方、テーブルの属性が存在する場合には、各テーブルの内容を比較する。例えばXHTMLの<TABLE>の要素にwidthの属性が合った場合には、その値がテーブルの幅の値となるので、その値が最大のものを選択する。

【0062】一方、<TABLE>の要素にwidthの属性がない場合には出力領域の横領域がそのテーブルの横領域となる。

【0063】次に、ステップ(5-3)においては、ステップ(5-2)で抽出されたテーブルの最大値から出力領域の拡大縮小率を算定(計算)する。なお、計算方法は出力領域の横領域と、ステップ(5-2)で求めたテーブルの最大横領域の比率から求めることができる。つまり、拡大縮小率=出力領域の横領域/テーブルの最大横領域となる。

【0064】そして、ステップ(5-4)以降において、各要素の配置および要素内の文字の配置位置等の計算を行なうため、ステップ(5-4)においては、まず対象となる要素がテーブル要素なのかテキスト要素なのかイメージ要素なのかの判定を行なう。

【0065】ここで、テーブル要素例としては、<TABLE>、<TR>、<TH>、<TD>、<CAPTION>、<THEAD>、<TFOOT>、<TBODY>等がある。テキスト要素としては、<H1>~<H6>、<P>、<Q>、<BLOCKQUOTE>、<EM>、<STRONG>、<SUP>、<SUB>等がある。

【0066】そして、イメージ要素例としては、<IMG>、<MAP>、<AREA>、<OBJECT>、<APPLET>等がある。それぞれの要素の意味については、WWW上のアドレス、例えばhttp://WWW.W3.org/TR/xhtml1/に記載されているXHTMLの仕様や、http://www.w3.org/TR/html40/に記載されているHTMLの仕様に準ずるものとする。

【0067】そして、対象となる要素がテーブルの要素であると判定された場合には、ステップ(5-5)へ進み、テキストの要素であると判定した場合には、ステップ(5-6)へ進み、イメージの要素であると判定した場合には、ステップ(5-7)へ進む。

【0068】そして、ステップ(5-5)においては、テーブルの要素であると判定された場合であり、テーブル内の配置を行なう。ここでの処理の詳細については、図10に示すフローチャートを用いて詳細に説明するのでここでの説明は省略する。

【0069】一方、ステップ(5-6)においては、テ

キストの要素であると判定された場合であり、テキスト要素内にある個々の文字に対する配置位置の決定を行なう。テキスト領域のうちブロック要素とインライン要素に分かれるが、ブロック要素としては、<H1>~<H6>、<P>要素等がある。また、インライン要素としては、<EM>、<STRONG>等がある。さらに、インライン要素はブロック要素の子要素として文章中のある文字列を強調したり、色を変えたりするときに使用される。

【0070】テキストのブロック要素の配置方法としては、まずテキスト領域の横領域を決定する。

【0071】ここでは、テキスト要素の親要素の横領域がテキスト領域の横領域ということになる。例えば親要素が<XHTML>であれば、それが最上位要素ということになるので、出力すべき用紙や画面のサイズの横領域がテキスト領域の横領域として設定される。

【0072】そして、文字の大きさに関しては、上記WC3Cの仕様であるCSSのプロパティで指定されている場合には、その値に対して、特に文字のサイズを指定していない場合には、ステップ(5-1)で求めた標準の文字サイズに対して、ステップ(5-3)で求めた拡大縮小率をかけた値を文字サイズの大きさとする。

【0073】そして、このとき決定された文字サイズの大きさは、後述するステップ(5-10)で、あらかじめ設定された最小サイズより大きい値に設定されているかどうかをチェックするので、保存しておく。そして、決定された文字サイズで文字を一文字ずつ配置していき、横領域を越えるところで文字の折り返しを行ない、次の行の先頭から続きを配置していく。そして、すべての文字を配置し終わったときに、そのときの行数とフォントサイズから領域の高さを計算する。このとき行間の大きさはCSSのプロパティで指定されている場合にはそれに従い、特に指定がない場合には、文字の高さに対してある一定の値を標準として、その行間の値を設定する。

【0074】また、テキストのインライン要素の配置方法としては、インラインに指定された文字列の一つ前の文字の配置位置の終了点を基準点とし、そこから要素で指定された文字種や文字サイズで各文字のピッチ情報に従って配置していく。

【0075】一方、ステップ5-7においては、イメージの要素であると判定された場合であり、イメージ要素の領域の決定と配置位置の決定の処理を行う。なお、本実施形態において、イメージ領域の大きさの決定方法は、イメージ領域の大きさがXHTMLドキュメントの中で指定してある大きさに対して、ステップ(5-3)で求めた拡大縮小率をかけた領域の大きさになる。

【0076】そして、ステップ(5-8)において、ステップ(5-5)からステップ(5-7)で求めた各要素の内容をSVGデータに変換する。このとき、テキス



トの要素は< t s p a n >にイメージ要素は< i m a g e >に変換される。

【0077】これにより、例えば図7に示したレイアウトのデータは、図6図に示したXHTMLのドキュメントで表され、それをSVGで表現すると図8に示したようになる。

【0078】次に、ステップ(5-9)においては、すべての要素に対してステップ(5-5)からステップ(5-7)の処理が終了したかどうかをチェックし、まだ処理が終了していないと判断した場合には、ステップ(5-4)へ戻って、各要素の配置位置の計算を行なう。

【0079】一方、ステップ(5-9)で、すべての要素に対して処理が終了していると判定した場合には、ステップ(5-10)で、各要素の中の配置およびフォントサイズの計算が行なわれた結果を見て、出力すべきフォントの大きさの最小値をチェックする。そして、あらかじめ設定されたフォントサイズより小さいフォントサイズのデータが存在する場合には、印刷しても小さすぎてみる事ができないので、全体領域を大きくする処理(詳細は、図10に示すフローチャートを用いて詳細に説明する)を行なう。

【0080】そして、ステップ(5-11)においては、すべての要素の配置位置が計算された後ドキュメント全体を< s v g >と< / s v g >で囲み、必要に応じてスタイルシートを< s t y l e >要素で定義して、s v gドキュメントの作成処理を終了する。

【0081】図10は、本発明に係る情報処理装置における第2のデータ処理手順の一例を示すフローチャートであり、図9に示したステップ(5-5)のテーブルの内容の配置位置の計算を行なう詳細手順に対応する。なお、(6-1)～(6-8)は各ステップを示す。

【0082】先ず、ステップ(6-1)ではテーブル内の各セルの横領域の計算を行なう。なお、本実施形態において、各セルの横領域の計算方法は、< T R >要素で囲まれる各セルの領域の大きさを合計して、親要素であるテーブル要素の横領域を各セルの割合に応じて割り当てる。

【0083】例えばXHTMLのドキュメント内のあるテーブルの子要素としてセルが3つあり、それぞれのセルの横領域が、セル1が「10」、セル2が「20」、セル3が「10」で、親要素のテーブルの横領域が「100」である場合、セル1の横領域は $100 \times (10 / 40) = 25$ となり、同様にセル2の横領域は「50」、セル3の横領域は「25」となる。

【0084】次に、ステップ(6-2)においては、各セルの内容をチェックする内容としては、さらにテーブルになっている場合、テキストになっている場合、あるいはイメージになっている場合がある。

【0085】そして、それぞれの判定方法は、図9に示

したステップ(5-4)で述べた方法と同様に、< T A B L E >、< T R >、< T H >、< T D >、< C A P T I O N >、< T H E A D >、< T F O O T >、< T B O D Y >等の要素であればテーブル要素と判定し、ステップ(6-7)に進み、拡大縮小率を再計算して、ステップ(6-1)に戻って、再起的にテーブル要素の処理を行なう。

【0086】なお、ステップ(6-7)は、セルの中にさらにテーブルの要素であると判定された場合であり、対象となるテーブルの親要素となるセルの大きさはステップ(6-1)で求めているので、その大きさに収まるようにテーブルのサイズを変換する必要がある。そして、そのときの計算方法は、拡大縮小率=親要素のテーブルの拡大縮小率×テーブルの横サイズ÷親要素のセルの横幅となる。

【0087】一方、ステップ(6-2)で、< H 1 >～< H 6 >、< P >、< Q >、< B L O C K Q U O T E >、< E M >、< S T R O N G >、< S U P >、< S U B >等の要素であればテキスト要素と判定し、ステップ(6-3)へ進み、そして、< I M G >、< M A P >、< A R E A >、< O B J E C T >、< A P P L E T >等の要素であればイメージと判定し、ステップ(6-6)へ進む。

【0088】そして、ステップ(6-3)からステップ(6-5)においては、テキストの要素であると判定された場合であり、テキスト要素内にある個々の文字に対する配置位置の決定を行なう。

【0089】なお、テキスト領域のうちブロック要素とインライン要素に分かれるが、ブロック要素としては、< H 1 >～< H 6 >、< P >要素等があり、インライン要素としては、< E M >、< S T R O N G >等がある。インライン要素はブロック要素の子要素として文章中のある文字列を強調したり、色を変えたりするときに使用される。

【0090】また、テキストのブロック要素の配置方法としては、まずテキスト領域の横領域を取り込む。ここでは、ステップ(6-1)で決定したセルの横領域がここで対象となるテキストの横領域となる。

【0091】先ず、ステップ(6-3)では、文字の大きさに関して、W3Cの仕様であるCSSのプロパティで指定されている場合にはその値に対して、特に文字のサイズを指定していない場合には、ステップ(5-1)で求めた標準の文字サイズに対して、ステップ(5-3)あるいはステップ(6-7)で求めた拡大縮小率をかけた値を文字サイズの大きさとする。

【0092】そして、このとき決定された文字サイズの大きさは、ステップ(5-10)であらかじめ設定された最小サイズより大きい値に設定されているかどうかをチェックするので、保存しておく。

【0093】そして、ステップ(6-4)において決定

された文字サイズで文字を1文字ずつ配置していき、横領域を越えるところで文字の折り返しを行ない、次の行の先頭から続きを配置していく。また、テキストのインライン要素の配置方法としては、インラインに指定された文字列の一つ前の文字の配置位置の終了点を基準点とし、そこから要素で指定された文字種や文字サイズで各文字のピッチ情報に従って配置して行き、すべての文字を配置し終わったとき、ステップ(6-5)において行数とフォントサイズから領域の高さを計算する。

【0094】このとき行間の大きさは、CSSのプロパティで指定されている場合にはそれに従い、特に指定がない場合には、文字の高さに対してある一定の値を標準として、その行間の値を設定する。

【0095】一方、ステップ(6-2)で、イメージの要素であると判定された場合であり、ステップ(6-6)へ進み、イメージ要素の領域の決定と配置位置の決定の処理を行なう。なお、本実施形態において、イメージ領域の大きさの決定方法は、イメージ領域の大きさがXHTMLドキュメントの中で指定してある大きさの縦横比を、ステップ(6-1)で求めたセルの横領域に適用して高さを求める。

【0096】そして、ステップ(6-8)においては、さらに処理すべきセルが存在するかどうかをチェックし、セルが存在すると判定した場合には、ステップ(6-2)へ戻って同様の処理を行ない、セルが存在しないと判定した場合には、処理を終了する。

【0097】図11は、本発明に係る情報処理装置における第3のデータ処理手順の一例を示すフローチャートであり、図10に示したステップ(5-8)のフォントサイズの最小値チェックとそれに応じた各ブロックのレイアウトの再設定処理の詳細手順に対応する。なお、(7-1)～(7-5)は各ステップを示す。

【0098】先ず、ステップ(7-1)においては、図9に示したステップ(5-1)で求めた基準フォントサイズとステップ(5-3)あるいは図10に示したステップ(6-7)で求めた各ブロックの拡大縮小率を元に各ブロックの基準フォントサイズの大きさを求める。計算方法としては単純に基準フォントサイズ×拡大縮小率となる。

【0099】そして、ステップ(7-2)においては、ステップ(7-1)で計算された各ブロックの基準フォントサイズの大きさを比較して、もっとも小さいフォントサイズの値を抽出する。

【0100】そして、ステップ(7-3)においては、あらかじめ設定された基準フォントサイズの最小値とステップ(7-2)で抽出された最小フォントサイズとを比較して、抽出された最小フォントサイズが、基準フォントサイズの最小値よりも小さいかどうかを判定して、大きいと判定した場合には、特に処理をする必要がないのでここで処理を終了する。

【0101】一方、ステップ(7-3)で、ステップ(7-2)で抽出された最小フォントサイズが基準フォントサイズの最小値よりも小さいと判定された場合には、出力フォントが小さくなりすぎて印刷してもフォントが小さくなりすぎて読めない等の弊害が出てしまうので、基準フォントサイズの最小値まで拡大する必要がある。ステップ(7-4)へ進み、ステップ(7-2)で求めた最小フォントサイズを基準フォントサイズの最小値まで拡大する拡大倍率計算を行なって、拡大倍率を求める。

【0102】次に、ステップ(7-5)においては、ステップ(7-4)で求めた拡大倍率を全てのブロックのフォントサイズ、配置位置座標値、領域の幅や高さ等に掛け算を行ない、全体領域を広げる各ブロック出力サイズの調整処理を行い、処理を終了する。

【0103】これにより、図12に示すように、指定出力用紙のサイズOUT(図12の(a))に無理やり縮小して文字がつぶれてしまっていたようなドキュメントも、図12の(b)に示すように複数ページP1～P4に広げることが可能となる。そして、プリンタ側では広げられた領域を複数ページに分割して出力を行なうことになる。

【0104】なお、プリンタにおける出力時に、両面印刷機能を有する場合には、両面印刷モードの指定状態を判定して、2枚の用紙の表裏に複数ページに分割して出力を行なうように構成してもよい。

【0105】上記実施形態によれば、HTMLファイルを印刷しようとした場合に、出力用紙サイズを意識して作成されていない為、出力用紙の用紙サイズに収まらず、領域をオーバーして印刷されるものや、領域に収めようとすると、文字が小さくなってしまって読めなくなってしまう等の問題点を解決し、HTMLの文書データの相対座標で指定されているデータと出力用紙のサイズを元にして、適切な領域の割り当ておよび文字のサイズの割り当てを行なうので、印刷装置に対する出力領域に適したレイアウトを行なうことが可能となる。

【0106】以下、図13に示すメモリマップを参照して本発明に係る情報処理装置を適用可能な印刷システムで読み出し可能なデータ処理プログラムの構成について説明する。

【0107】図13は、本発明に係る情報処理装置を適用可能な印刷システムで読み出し可能な各種データ処理プログラムを格納する記憶媒体のメモリマップを説明する図である。

【0108】なお、特に図示しないが、記憶媒体に記憶されるプログラム群を管理する情報、例えばバージョン情報、作成者等も記憶され、かつ、プログラム読み出し側のOS等に依存する情報、例えばプログラムを識別表示するアイコン等も記憶される場合もある。

【0109】さらに、各種プログラムに従属するデータ

も上記ディレクトリに管理されている。また、各種プログラムをコンピュータにインストールするためのプログラムや、インストールするプログラムが圧縮されている場合に、解凍するプログラム等も記憶される場合もある。

【0110】本実施形態における図9～図11に示す機能が外部からインストールされるプログラムによって、ホストコンピュータにより遂行されていてもよい。そして、その場合、CD-ROMやフラッシュメモリやFD等の記憶媒体により、あるいはネットワークを介して外部の記憶媒体から、プログラムを含む情報群を出力装置に供給される場合でも本発明は適用されるものである。

【0111】以上のように、前述した実施形態の機能を実現するソフトウェアのプログラムコードを記録した記憶媒体を、システムあるいは装置に供給し、そのシステムあるいは装置のコンピュータ（またはCPUやMPU）が記憶媒体に格納されたプログラムコードを読み出し実行することによっても、本発明の目的が達成されることは言うまでもない。

【0112】この場合、記憶媒体から読み出されたプログラムコード自体が本発明の新規な機能を実現することになり、そのプログラムコードを記憶した記憶媒体は本発明を構成することになる。

【0113】プログラムコードを供給するための記憶媒体としては、例えば、フロッピーディスク、ハードディスク、光ディスク、光磁気ディスク、CD-ROM、CD-R、磁気テープ、不揮発性のメモリカード、ROM、EEPROM等を用いることができる。

【0114】また、コンピュータが読み出したプログラムコードを実行することにより、前述した実施形態の機能が実現されるだけでなく、そのプログラムコードの指示に基づき、コンピュータ上で稼働しているOS（オペレーティングシステム）等が実際の処理の一部または全部を行い、その処理によって前述した実施形態の機能が実現される場合も含まれることは言うまでもない。

【0115】さらに、記憶媒体から読み出されたプログラムコードが、コンピュータに挿入された機能拡張ボードやコンピュータに接続された機能拡張ユニットに備わるメモリに書き込まれた後、そのプログラムコードの指示に基づき、その機能拡張ボードや機能拡張ユニットに備わるCPU等が実際の処理の一部または全部を行い、その処理によって前述した実施形態の機能が実現される場合も含まれることは言うまでもない。

【0116】

【発明の効果】以上説明したように、本発明に係る第1～第15の発明によれば、ブロックの要素を各属性毎に解析して、ドキュメントファイル中のテキストデータがあらかじめ設定される最小文字サイズ以上の文字サイズとして印刷可能なレイアウト形式のドキュメントファイルにフォーマット変換して、相対座標で指定されている

ドキュメントの各属性に従うデータと出力用紙のサイズとに基づき、適切な領域の割り当ておよび文字のサイズの割り当てを行なうことにより、出力用紙サイズを意識して作成されていない為、出力用紙の用紙サイズに収まらず、領域をオーバーして印刷されるものや、領域に収めようとすると、文字が小さくなってしまて読めなくなってしまう事態を回避して、レイアウトが規定されない属性の異なる複数のブロックからなるドキュメントファイルから印刷装置に対する出力領域に適したレイアウトを行なわれたドキュメントファイルを生成できる効果を奏する。

【図面の簡単な説明】

【図1】本発明の情報処理装置を適用可能な文書印刷システムの構成を説明する図である。

【図2】図1に示したクライアントパソコン及びファイルサーバ及びWebサーバの概略構成を示すブロック図である。

【図3】図2に示したRAMのメモリマップの一例を示す図である。

【図4】図1に示したプリンタの構成を説明するブロック図である。

【図5】本発明に係る情報処理装置におけるドキュメントの変換処理状態を説明するブロック図である。

【図6】図5に示したXHTML形式のドキュメント例を説明する図である。

【図7】図6に示したXHTML形式のドキュメント例のレイアウト構造を説明する図である。

【図8】図7に示したXHTML形式のドキュメントのSVG変換リスト例を説明する図である。

【図9】本発明に係る情報処理装置における第1のデータ処理手順の一例を示すフローチャートである。

【図10】本発明に係る情報処理装置における第2のデータ処理手順の一例を示すフローチャートである。

【図11】本発明に係る情報処理装置における第3のデータ処理手順の一例を示すフローチャートである。

【図12】本発明に係る情報処理装置における自動レイアウト出力例を示す図である。

【図13】本発明に係る情報処理装置を適用可能な印刷システムで読み出し可能な各種データ処理プログラムを格納する記憶媒体のメモリマップを説明する図である。

【符号の説明】

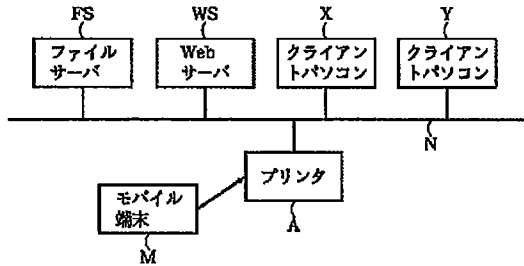
- 101 CPU
- 102 ROM
- 103 RAM
- 104 KBC
- 105 KB
- 106 CRT C
- 107 CRT
- 108 DKC
- 109 外部記憶装置

110 NTC  
111 NT

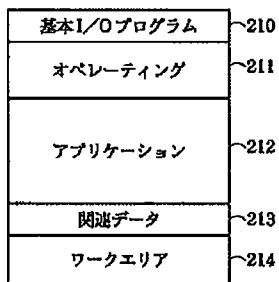
\* 112 システムバス

\*

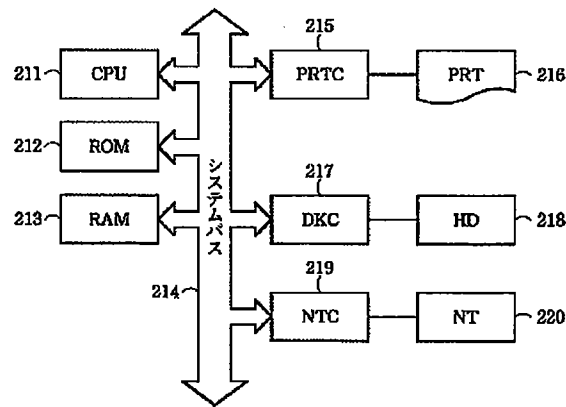
【図1】



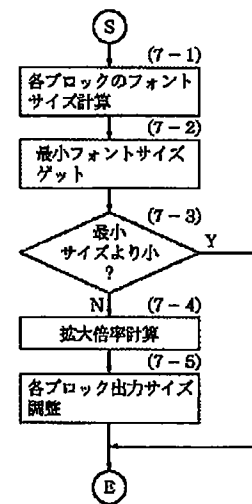
【図3】



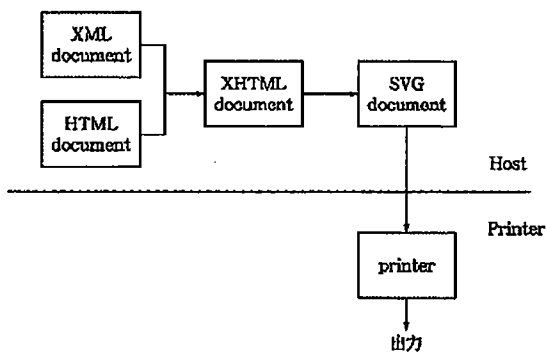
【図4】



【図11】



【図5】



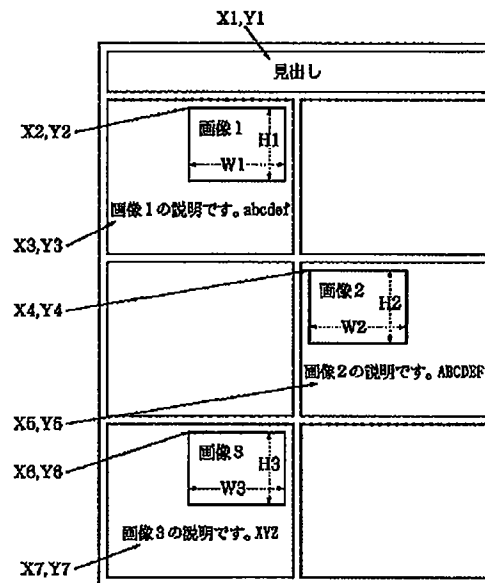
【図6】

```

<html>
<table border="0" cellpadding="0" cellspacing="8">
  <tr>
    <td align="center" width="50%"><font size="6"><em>見出し</em></font></td>
  </tr>
  <tr>
    <td align="right" width="50%">
    <br><br>
    画像1の説明です。abcdef.....
  </td>
  <td align="right" width="50%"></td>
  </tr>
  <tr>
    <td width="50%"></td>
    <td width="50%">
    <br><br>
    画像2の説明です。ABCDEF
  </td>
  </tr>
  <tr>
    <td align="right" width="50%">
    <br><br>
    画像3の説明です。XYZ
  </td>
  <td width="50%"></td>
  </tr>
</table>
</html>

```

【図7】



【図8】

```

<svg>
  <next font-family:gothic font-size:20pt font-weight:bold font-style:italic x=X1 y=Y1>
  見出し
  </next>
  <image x=X2 y=Y2 width=W1 height=H1>
  画像1.jpg
  </image>
  <text font-family:mincho font-size:10pt x=X3 y=Y3>
  画像1の説明です。abcdef.....
  </text>
  <image x=X4 y=Y4 width=W2 height=H2>
  画像2.jpg
  </image>
  <text font-family:mincho font-size:10pt x=X5 y=Y5>
  画像2の説明です。ABCDEF.....
  </text>
  <image x=X6 y=Y6 width=W3 height=H3>
  画像3.jpg
  </image>
  <text font-family:mincho font-size:10pt x=X7 y=Y7>
  画像3の説明です。XYZ.....
  </text>
</svg>

```

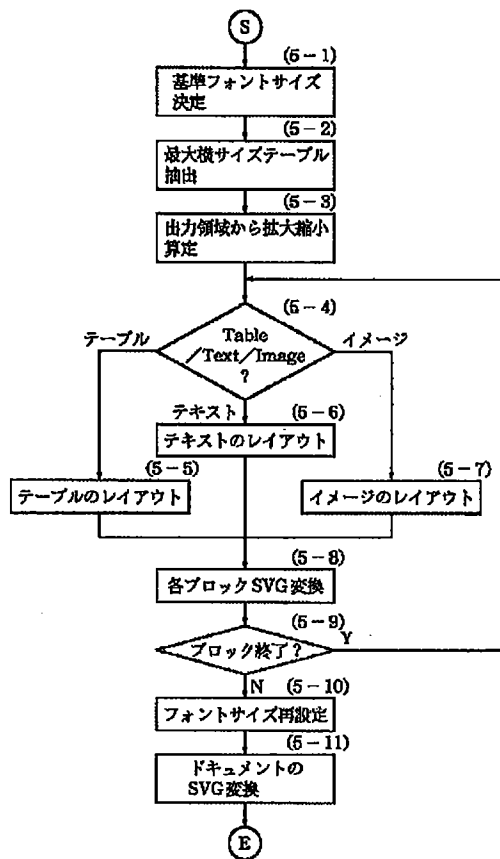
【図13】

FD/CD-ROM等の記憶媒体

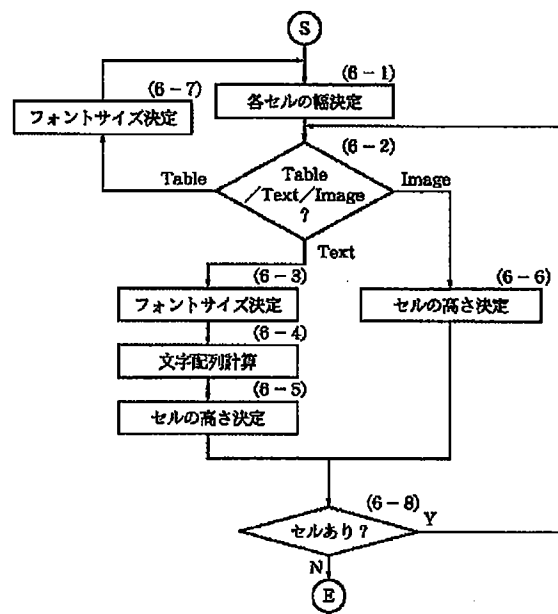
ディレクトリ情報
第1のデータ処理プログラム 図9に示すフローチャートのステップに対応する プログラムコード群
第2のデータ処理プログラム 図10に示すフローチャートのステップに対応する プログラムコード群
第3のデータ処理プログラム 図11に示すフローチャートのステップに対応する プログラムコード群

記憶媒体のメモリマップ

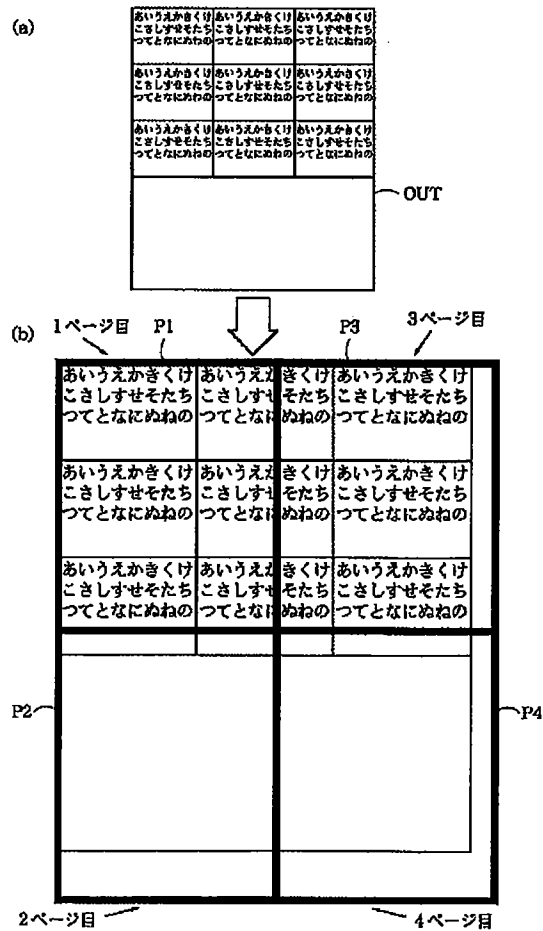
【図9】



【図10】



【図12】



フロントページの続き

(51) Int. Cl.<sup>7</sup>H 0 4 N 1/387  
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F I

H 0 4 N 1/387  
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3.In the drawings, any words are not translated.

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## CLAIMS

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[Claim(s)]

[Claim 1]Are an information processor which can process a document file which consists of several blocks with which attributes as which a layout is not specified differ, and an element of said block of each is analyzed for every attribute, An information processor having an arrangement means arranged to two or more power ranges determined that it will print with character size more than the minimum character size to which text data in said document file is set beforehand with a paper size of a printer in an element of each block.

[Claim 2]The information processor comprising according to claim 1:

A setting-out means to set up output paper size [ as opposed to said document file, in said arrangement means ].

A determination means to determine size of each block based on output paper size set up by said setting-out means.

A magnification determination means to ask for a rate of scaling of a power range and character size based on size of each block determined by said determination means.

A calculating means which calculates character size of each block based on a rate of scaling called for by said magnification determination means, A judging means which asks for a font size by said calculating means from all the blocks, and judges whether the minimum font size is larger than a font size set up beforehand, A magnification means to which size of each block is expanded to the minimum font size set up beforehand when it judges with it being smaller than a font size to which the minimum font size was beforehand set by said judging means.

[Claim 3]The information processor according to claim 1, wherein said attribute includes a text, an image, and a table.

[Claim 4]The information processor according to claim 2, wherein said minimum font size enables setting out of arbitrary sizes.

[Claim 5]The information processor according to claim 1 or 2, wherein said document file includes HTML form, XML form, and extended format of HTML form or XML form.

[Claim 6]Are an information processing method in an information processor which can process a document file which consists of several blocks with which attributes as which a layout is not specified differ, and an element of said block of each is analyzed for every attribute, An information processing method having an arrangement process arranged to two or more power ranges determined that it will print with character size more than the minimum character size to which text data in said document file is set beforehand with a paper size of a printer in an element of each block.

[Claim 7]The information processing method comprising according to claim 6:

A setting-out process of setting up output paper size [ as opposed to said document file, in said arrangement process ].

A decision process which determines size of each block based on output paper size set up by said setting-out process.

A magnification decision process which asks for a rate of scaling of a power range and character size based on size of each block determined by said decision process.



A calculation process which calculates character size of each block based on a rate of scaling called for by said magnification decision process, A determination process which asks for a font size according to said calculation process from all the blocks, and judges whether the minimum font size is larger than a font size set up beforehand, An expansion process to which size of each block is expanded to the minimum font size set up beforehand when it judges with it being smaller than a font size to which the minimum font size was beforehand set by said determination process.

[Claim 8]The information processing method according to claim 6, wherein said attribute includes a text, an image, and a table.

[Claim 9]The information processing method according to claim 7, wherein said minimum font size enables setting out of arbitrary sizes.

[Claim 10]The information processing method according to claim 6 or 7, wherein said document file includes HTML form, XML form, and extended format of HTML form or XML form.

[Claim 11]To an information processor which can process a document file which consists of several blocks with which attributes as which a layout is not specified differ, an element of said block of each is analyzed for every attribute, So that it may print with character size more than the minimum character size to which text data in said document file is set beforehand. A storage which a computer which recorded a program for performing an arrangement process which arranges an element of each block to two or more power ranges determined with a paper size of a printer can read.

[Claim 12]The storage comprising according to claim 11:

A setting-out process of setting up output paper size [ as opposed to said document file, in said arrangement process ].

A decision process which determines size of each block based on output paper size set up by said setting-out process.

A magnification decision process which asks for a rate of scaling of a power range and character size based on size of each block determined by said decision process.

A calculation process which calculates character size of each block based on a rate of scaling called for by said magnification decision process, A determination process which asks for a font size according to said calculation process from all the blocks, and judges whether the minimum font size is larger than a font size set up beforehand, An expansion process to which size of each block is expanded to the minimum font size set up beforehand when it judges with it being smaller than a font size to which the minimum font size was beforehand set by said determination process.

[Claim 13]The storage according to claim 11, wherein said attribute includes a text, an image, and a table.

[Claim 14]The storage according to claim 12, wherein said minimum font size enables setting out of arbitrary sizes.

[Claim 15]The storage according to claim 11 or 12, wherein said document file includes HTML form, XML form, and extended format of HTML form or XML form.

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[Translation done.]

**\* NOTICES \***

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the information processor, information processing method, and storage which can process the document file which consists of several blocks with which the attributes as which a layout is not specified differ.

[0002]

[Description of the Prior Art]In recent years, with the spread of communication media, such as the Internet, Web on a network is accessed from information processors, such as a personal computer, the information on various homepages is perused, the information considered as a request is downloaded, and the opportunity to print from various printers is increasing.

[0003]Under the present circumstances, the document data described in the HTML (HyperText Markup Language) form used as exchange document data of Web, Or the document data described in the XML (Extensible Markup Language) form expected as a standard format of document data from now on will be printed from the printer connected with the network from the server. In this case, in the information processor treating the data of HTML, a paper size, resolution, etc. at the time of an output are created by the data of HTML in many cases, without being conscious.

[0004]call the contents of the HTML file a browser -- it and, [ \*\*\*\*\*-inspection-] For example, when area size is changed by Internet Explorer by Microsoft Corp., Netscape Communications Netscape Navigator, etc., It is defined as the ability also of a layout to change according to the changed field at the relative coordinate value or a rate in many cases.

[0005]

[Problem(s) to be Solved by the Invention]However, since it is not created being conscious of output paper size when it is going to print the above-mentioned HTML file with a printer, there is a problem of the sizes of the expected thing and an output differing and being printed.

[0006]For example, it did not fit in the paper size of an output paper, but when it was going to store the field in what is printed by carrying out Oba, and a field, there was a problem of becoming small and it becoming impossible to read a character etc.

[0007]Were made in order that this invention might solve the above-mentioned problem, and the element of a block is analyzed for every attribute, Format conversion is carried out to the document file of the layout form which can be printed as character size more than the minimum character size to which the text data in a document file is set beforehand, Based on the data and the size of an output paper according to each attribute of the document specified by the relative coordinate, by assigning assignment of a suitable field, and the size of a character, It is providing the information processor, information processing method, and storage which can generate the document file which had the layout which was suitable for the power range to a printer from the document file which consists of several blocks with which the attributes as which a layout is not specified differ performed.

[0008]

[Means for Solving the Problem]The 1st invention concerning this invention is an information processor which can process a document file which consists of several blocks with which

attributes as which a layout is not specified differ, and analyzes an element of said block of each for every attribute, So that it may print with character size more than the minimum character size to which text data in said document file is set beforehand. It has an arrangement means (equivalent to data processing by CPU101 shown in drawing 2) which arranges an element of each block to two or more power ranges determined with a paper size of a printer.

[0009]The 2nd invention concerning this invention said arrangement means, A setting-out means (equivalent to data processing by CPU101 shown in drawing 2) to set up output paper size to said document file, A determination means (equivalent to data processing by CPU101 shown in drawing 2) to determine size of each block based on output paper size set up by said setting-out means, A magnification determination means (equivalent to data processing by CPU101 shown in drawing 2) to ask for a rate of scaling of a power range and character size based on size of each block determined by said determination means, A calculating means which calculates character size of each block based on a rate of scaling called for by said magnification determination means, It asks for a font size by said calculating means from all the blocks, When it judges that it is smaller than a font size to which the minimum font size was beforehand set by judging means (equivalent to data processing by CPU101 shown in drawing 2) to judge, and said judging means whether the minimum font size is larger than a font size set up beforehand, It has a magnification means (equivalent to data processing by CPU101 shown in drawing 2) to which size of each block is expanded to the minimum font size set up beforehand.

[0010]In the 3rd invention concerning this invention, said attribute includes a text, an image, and a table.

[0011]Said minimum font size enables setting out of arbitrary sizes of the 4th invention concerning this invention.

[0012]In the 5th invention concerning this invention, said document file includes HTML form, XML form, and extended format of HTML form or XML form.

[0013]The 6th invention concerning this invention is an information processing method in an information processor which can process a document file which consists of several blocks with which attributes as which a layout is not specified differ, and analyzes an element of said block of each for every attribute, So that it may print with character size more than the minimum character size to which text data in said document file is set beforehand. It has an arrangement process (Step 5-1 to 5-11 shown in drawing 9) which arranges an element of each block to two or more power ranges determined with a paper size of a printer.

[0014]The 7th invention concerning this invention said arrangement process, A setting-out process (not shown) of setting up output paper size to said document file, A decision process (Step 5-3 shown in drawing 9) which determines size of each block based on output paper size set up by said setting-out process, A magnification decision process (Step 5-3 shown in drawing 9) which asks for a rate of scaling of a power range and character size based on size of each block determined by said decision process, A calculation process (Step 6-3 shown in drawing 10) which calculates character size of each block based on a rate of scaling called for by said magnification decision process, A determination process (Step 7-3 shown in drawing 11) which asks for a font size according to said calculation process from all the blocks, and judges whether the minimum font size is larger than a font size set up beforehand, When it judges with it being smaller than a font size to which the minimum font size was beforehand set by said determination process, it has an expansion process (Step 7-5 shown in drawing 11) to which size of each block is expanded to the minimum font size set up beforehand.

[0015]In the 8th invention concerning this invention, said attribute includes a text, an image, and a table.

[0016]Said minimum font size enables setting out of arbitrary sizes of the 9th invention concerning this invention.

[0017]In the 10th invention concerning this invention, said document file includes HTML form, XML form, and extended format of HTML form or XML form.

[0018]The 11th invention concerning this invention analyzes an element of said block of each for every attribute to an information processor which can process a document file which consists of several blocks with which attributes as which a layout is not specified differ, So that it may print

with character size more than the minimum character size to which text data in said document file is set beforehand. A program for performing an arrangement process which arranges an element of each block to two or more power ranges determined with a paper size of a printer is made to record on a recording medium so that reading of a computer is possible.

[0019]The 12th invention concerning this invention said arrangement process, A setting-out process (not shown) of setting up output paper size to said document file, A decision process (Step 5-3 shown in drawing 9) which determines size of each block based on output paper size set up by said setting-out process, A magnification decision process (Step 5-3 shown in drawing 9) which asks for a rate of scaling of a power range and character size based on size of each block determined by said decision process, A calculation process (Step 6-3 shown in drawing 10) which calculates character size of each block based on a rate of scaling called for by said magnification decision process, A determination process (Step 7-3 shown in drawing 11) which asks for a font size according to said calculation process from all the blocks, and judges whether the minimum font size is larger than a font size set up beforehand, When it judges with it being smaller than a font size to which the minimum font size was beforehand set by said determination process, it has an expansion process (Step 7-5 shown in drawing 11) to which size of each block is expanded to the minimum font size set up beforehand.

[0020]In the 13th invention concerning this invention, said attribute includes a text, an image, and a table.

[0021]Said minimum font size enables setting out of arbitrary sizes of the 14th invention concerning this invention.

[0022]As for the 15th invention concerning this invention, said document file performs \*\*\*\* for HTML form, XML form, and extended format of HTML form or XML form.

[0023]

[Embodiment of the Invention]Drawing 1 is a figure explaining the composition of the document printing system which can apply the information processor of this invention.

[0024]In drawing 1, this system Two or more personal computers (henceforth a client personal computer) X and Y. It has one set of one set of file server FS, and Web server WS, and the composition that the printer A which can process at least one set of XML data was connected by the network N.

[0025]And without mobile terminal M like a Personal Digital Assistant connecting with the printer A through direct IrDA, RS-232C, Centronics, etc. at a network, it is connected so that the printer A and communication are possible.

[0026]It is also possible to connect information processors, such as a word processor, a workstation, and a Personal Digital Assistant, instead of the client personal computers X and Y. A font data group, data of Web, image data, etc. which the client personal computers X and Y and file server FS require for two or more sorts of fonts are stored.

[0027]The printing demand of URL of web, print copies, etc. to print to the printer A is advanced from mobile terminal M or the client personal computer X or Y by this system, A file request is advanced from the printer A to Web server WS, Web server WS collects required document data, font data, etc. from file server FS, and transmits them to the printer A, and the printer A prints by developing the transmitted data.

[0028]Drawing 2 is a block diagram showing the outline composition of the client personal computers X and Y, file server FS, and Web server WS shown in drawing 1.

[0029]In drawing 2, 101 is CPU, i.e., a central processing unit, and performs control, data processing, etc. of this whole device. 102 is ROM and memorizes the character pattern data for a system startup program and transliterations, etc. 103 is RAM and stores temporarily the result of an operation of data [ which is used for the operation of CPU101 ], and CPU101.

[0030]104 is a keyboard control section (KBC), from the keyboard (KB) 105, receives key ON KADETA (a character code and a control code), and transmits it to CPU101. 106 is a controlling-display part (CRTC), reads the display information stored in RAM103, i.e., the bitmapped image changed from the character code, and transmits it to CRT107. From CRTC106, CRT107 receives a bitmapped image and displays it on a display screen.

[0031]108 is a disk control section (DKC) and controls the data communications of the external

storage 109, etc. 109 is an external storage and comprises a FD, i.e., a floppy (registered trademark) disk unit, HD, i.e., a hard disk drive, or a CD-ROM. A program and data are stored in the external storage 109, and CPU101 refers to stored data if needed, or is loaded to RAM103. [0032]110 is a network control section (NTC) and performs communication operation control of the network device (NT) 111. 112 is a system bath and performs data transfer between above-mentioned components.

[0033]Drawing 3 is a figure showing an example of the memory map of RAM103 shown in drawing 2, and corresponds to the memory map in the system configuration shown in drawing 1.

[0034]In drawing 3, this device operates by performing operating systems, such as a basic I/O program and a window system, and application used as processing of this invention. The basic I/O program is stored in ROM102 shown in drawing 1. The operating system is stored in the hard disk (HD) shown in the external storage 109 shown in drawing 1. And when a power supply is turned on, an operating system is read into RAM from HD with the IPL (initializing program loading) function in a basic I/O program, and the operation is started.

[0035]The program and associated data concerning this invention are supplied via storages, such as a floppy disk (FD) in the external storage 109 shown in drawing 1, or CD-ROM. And by once carrying out HD HEIN stole of a program and the associated data from FD or CD-ROM, It is also possible to carry out a RAM load and to perform from direct FD or CD-ROM, without becoming possible from HD to load to RAM103 and to perform, or carrying out HD HEIN stole.

[0036]In drawing 3, 210 is a basic I/O program and shows the state where it was loaded to RAM103 and execution became possible from the ROM102 grade.

[0037]211 shows the state where operating systems, such as a window system, were loaded to RAM103, and execution of them was attained. 212 shows the state where application including the program of this invention, etc. was loaded to RAM103, and execution of it was attained.

[0038]213 is associated data, the state where it was loaded to RAM103 and execution became possible is shown, and 214 is a work area which each program uses.

[0039]A basic I/O program is read into RAM103 by the system startup program in ROM102. An application program and where the hard disk drive HEIN stole of the associated data is once carried out [ CD-ROM / the floppy disk drive unit as the external storage 109, or ], when a power supply is turned on, By loading to RAM103 from a hard disk drive, it becomes possible to perform.

[0040]It is also possible to load to RAM103 and to perform from a direct floppy disk drive unit or CD-ROM, without carrying out a hard disk drive HEIN stole. The below-mentioned printer information table is formed in the field of associated data in file server FS.

[0041]Drawing 4 shall be a block diagram explaining the composition of the printer A shown in drawing 1, and via the network device 111 and network device of a document processing system which were shown in drawing 2, shall be constituted so that communication is possible.

[0042]the output engines in this system may be laser beam printers -- it may carry out and they may be output engines, such as a bubble jet (registered trademark) printer or hot printing, -- it is -- \*\* It has a function which can carry out the printing job of XML form document data, graphic data, tabular format data, and the image data.

[0043]In drawing 4, 211 is CPU and performs control, data processing, etc. of this whole device. 212 is ROM and has memorized the character pattern data according to the system startup program which CPU211 should execute, and style of handwriting, etc.

[0044]213 is RAM, is a data storage area without use restrictions, and is a field which each program and data are loaded and is performed for every various processings.

[0045]215 is a printer controller (PRTC) and 216 is printer engine (PRT). 214 is a system bath and should become a passage of the data between above-mentioned components. 217 is a disk controller (DKC) and controls data write access or data read access from the hard disk 218 to the hard disk 218.

[0046]219 is a network control section (NTC) and performs motion control of the network device (NT) 220. Character pattern data (font data) etc. are stored in ROM212. And document data, image data or font data required of Web server WS is downloaded and stored in RAM213 or HD217 from Web server WS.

[0047]CPU211 generates character pattern data and image data (bit map data) according to the program which is in ROM212 about the document data, image data, or font data supplied from Web server WS. It develops to the printing buffer in the printer controller 215.

[0048]The printer controller 215 outputs the printing control signal generated based on bit map data to the printer engine 216. The network controller 217 is controlling operation of the client personal computers X and Y and the file servers FS and the network device at the time of performing data transmission and reception in between (NT)218 via the network N shown in drawing 1.

[0049]Drawing 5 is a block diagram explaining the conversion process state of the document in the information processor concerning this invention.

[0050]The flow of this processing is divided into the processing by the side of a host, and the processing by the side of a printer, and processing by the side of a host is performed on Web server WS shown in drawing 1, or is processed with the client personal computer X or the client personal computer Y.

[0051]This processing reads the document saved by the document first saved by XML form from file server FS shown in drawing 1, or HTML form. It is once changed into the data of the form of XHTML (ExtensibleHyper Text Markup Language). And it changes into SVG (Scalable Vector Graphic) which performs a suitable layout according to output paper size or resolution according to the flow chart shown in drawing 9 from there.

[0052]The contents of XHTML and SVG are indicated in the technical report of W3C. XHTML extends the grammar of HTML according to XML form, and is fundamentally suitable for display processing.

[0053]On the other hand, like the grammar of page description, such as PS (Adobe Post Script), XML extension is carried out and SVG is suitable for the output format. Therefore, the document data of HTML or XML is once changed into XHTML, and output paper size and resolution are obtained further there, and it changes into the data of SVG form, and transmits by the PURINTAHE SVG file as which SVG can interpret it. By doing so, it becomes possible to arrange appropriately the document data which was able to be applied in XML or HTML, and to output it.

[0054]Drawing 6 is a figure explaining the example of a document of the XHTML form shown in drawing 5, drawing 7 is a figure explaining the layout structure of the example of a document of the XHTML form shown in drawing 6, and drawing 8 is a figure explaining the example of a SVG conversion list of the document of the XHTML form shown in drawing 7.

[0055]Next, according to the flow chart shown in drawing 9, the detailed flow of the processing changed into document data (document) including the picture of SVG form, etc. from the document data of the XHTML form in the information processor concerning this invention is explained.

[0056]Drawing 9 is a flow chart which shows an example of the 1st data-processing procedure in the information processor concerning this invention. - (5-1) (5-11) shows each step.

[0057]First, it asks for the font size which serves as a standard of conversion out of the data of the XHTML form which becomes a changing agency in a step (5-1). The font size in particular used as a standard is not specified by the file of XHTML.

[0058]Therefore, although each browser has defined the standard font size uniquely in many cases, values, such as 10 point or 10.5 etc. points, are defined as a standard font size to an output paper here.

[0059]When the standard font size has entered into an XHTML document, the value is defined as a standard font size.

[0060]Next, the whole XHTML document is checked in a step (5-2). When it investigates whether there is any attribute of a table, the maximum horizontal size table is extracted and there is no attribute of a table, the embezzlement region of the size of a predetermined paper to output or a screen serves as size used as the standard of the embezzlement region of the tag which is each XHTML element.

[0061]On the other hand, when the attribute of a table exists, the contents of each table are compared. For example, since the value turns into a value of the width of a table when the attribute of width suits the element of <TABLE> of XHTML, the value chooses the greatest

thing.

[0062]On the other hand, when there is no attribute of width in the element of <TABLE>, the embezzlement region of a power range turns into an embezzlement region of the table.

[0063]Next, in a step (5-3), the rate of scaling of a power range is calculated from the maximum of the table extracted at the step (5-2) (calculation). A calculation method can be searched for from the ratio of the embezzlement region of a power range, and the maximum embezzlement region of the table for which it asked at the step (5-2). That is, it becomes the maximum embezzlement region of the embezzlement region / table of a rate of scaling = power range.

[0064]And in order to calculate arrangement of each element, the locating position of the character within an element, etc. after a step (5-4), in a step (5-4), it is judged whether the target element is a table element first, whether it is a text element, and whether it is an image element.

[0065]Here, as an example of a table element, there are <TABLE>, <TR>, <TH>, <TD>, <CAPTION>, <THEAD>, <TFOOT>, <TBODY>, etc. As a text element, there are <H1>- <H6>, <P>, <Q>, <BLOCKQUOTE>, <EM>, <STRONG>, <SUP>, a <SUB>, etc.

[0066]And as image element LEO, there are <IMG>, <MAP>, <AREA>, <OBJECT>, <APPLET>, etc. The specification of XHTML indicated about the meaning of each element to address [ on WWW ], for example, [http://WWW.W3.org/TR/xhtml1, 1/](http://WWW.W3.org/TR/xhtml1/1/), It shall apply to the specification of HTML indicated to <http://www.w3.org/TR/htm140/>.

[0067]And when it judges with it progressing to a step (5-6), and being an element of an image, when it judges with it progressing to a step (5-5), and being an element of a text, when judged with the target element being an element of a table, it is step (5-7) HE \*\*\*\*.

[0068]And in a step (5-5), it is a case where it is judged with it being an element of a table, and arrangement in a table is performed. Since the details of processing here are explained in detail using the flow chart shown in drawing 10, explanation here is omitted.

[0069]On the other hand, in a step (5-6), it is a case where it is judged with it being an element of a text, and the locating position to the discrete character in a text element is determined. Although divided into a block element and an in-line element among text areas, there are a <H1>- <H6> and <P> element etc. as a block element. There are <EM>, <STRONG>, etc. as an in-line element. An in-line element is used, when emphasizing a certain character string in a text as a child element of a block element or changing a color.

[0070]As a configuration method of the block element of a text, the embezzlement region of a text area is determined first.

[0071]Here, the embezzlement region of the parent element of a text element will call it the embezzlement region of a text area. For example, since it will call it the top element if a parent element is <XHTML>, the embezzlement region of the size of a paper or a screen which should be outputted is set up as an embezzlement region of a text area.

[0072]And when specified about the size of a character with the property of CSS which is the specification of the above-mentioned W3C. When the size in particular of a character is not specified to the value, let the value to which the rate of scaling for which it asked at the step (5-3) was applied be a size of character size to the character size of the standard searched for at the step (5-1).

[0073]And since it confirms whether the size of the character size determined at this time is set as the larger value than the minimum size which is a step (5-10) mentioned later, and was set up beforehand, it saves. And the character is arranged a single character every with the determined character size, the clinch of a character is performed in the place exceeding an embezzlement region, and the continuation is arranged from the head of the following line. And when finishing arranging all the characters, the height of a field is calculated from the number of lines and font size at that time. At this time, the size of spacing sets up the value of that spacing by making a certain fixed value into a standard to the height of character, when are specified with the property of CSS and there is no specification in particular according to it.

[0074]As a configuration method of the in-line element of a text, the end point of the locating position of the character in front of [ of the character string specified as in-line ] one is made into a reference point, and it arranges according to the pitch information of each character with

the character type and character size which were specified with the element from there.

[0075]On the other hand, in Step 5-7, it is a case where it is judged with it being an element of an image, and the determination of the field of an image element and the determination of a locating position are processed. In this embodiment, the deciding method of the size of an image area becomes the area size to which the rate of scaling for which the size of the image area asked at the step (5-3) from the size specified in the XHTML document was applied.

[0076]And in a step (5-8), the contents of each element searched for at the step (5-7) are changed into SVG data from a step (5-5). At this time, the element of a text is changed into `<tspan>` and an image element is changed into `<image>`.

[0077]Thereby, the data of the layout shown, for example in drawing 7 was expressed with the document of XHTML shown in the drawing 6 figure, and when it was expressed by SVG, it came to be shown in drawing 8.

[0078]Next, in a step (5-9), it confirms whether processing of a step (5-5) to the step (5-7) was completed to all the elements, and when it is judged that processing has not been completed yet, the locating position of each element is calculated by returning to a step (5-4).

[0079]On the other hand, when it judges with processing being completed to all the elements at the step (5-9), the result to which arrangement in each element and calculation of the font size were carried out is seen at a step (5-10), and the minimum of the size of the font which should be outputted is checked. And since it cannot be too small even if it prints when the data of a font size smaller than the font size set up beforehand exists, processing (for details, it explains in detail using the flow chart shown in drawing 10) which enlarges a whole field is performed.

[0080]And in a step (5-11), the whole back document by which the locating position of all the elements was calculated is surrounded by `<svg>` and `</svg>`, the `<style>` element defines a style sheet if needed, and creation processing of a svg document is ended.

[0081]Drawing 10 is a flow chart which shows an example of the 2nd data-processing procedure in the information processor concerning this invention, and corresponds to the detailed level procedure which calculates the locating position of the contents of the table of the step (5-5) shown in drawing 9. - (6-1) (6-8) shows each step.

[0082]First, at a step (6-1), the embezzlement region of each cell in a table is calculated. In this embodiment, the calculation method of the embezzlement region of each cell totals the area size of each cell surrounded with the `<TR>` element, and assigns the embezzlement region of the table element which is a parent element according to the rate of each cell.

[0083]For example, in "10" and the cell 2, "20" and the cell 3 as a child element of a certain table in the document of XHTML by "10". [ a cell ] [ those with three, and the embezzlement region of each cell ] [ the cell 1 ] When the embezzlement region of the table of a parent element is "100", the embezzlement region of the cell 1 is set to  $100 \times (10/40) = 25$ , and, in the embezzlement region of the cell 2, "50" and the embezzlement region of the cell 3 are set to "25" in a similar manner.

[0084]Next, in the step (6-2), when it is a table further and a text as contents which check the contents of each cell, it may be an image.

[0085]And each judgment method like the method described at the step (5-4) shown in drawing 9, If it is elements, such as `<TABLE>`, `<TR>`, `<TH>`, `<TD>`, `<CAPTION>`, `<THEAD>`, `<TFOOT>`, and `<TBODY>`, will judge with a table element, and progress to a step (6-7), and the rate of scaling is re-calculated, It returns to a step (6-1), and a table element is processed in recovery.

[0086]A step (6-7) is a case where it is judged with it being an element of a table further in a cell, and since it has asked for the size of the cell used as the parent element of the target table at the step (6-1), it needs to change the size of a table so that it may fit in the size. And the calculation method at that time serves as breadth of the cell of the transverse size / parent element of the expansion  $\text{*****} \times \text{table of the table of a rate of scaling} = \text{parent element}$ .

[0087]On the other hand, at a step (6-2), `<H1>`- `<H6>`, `<P>`, `<Q>`, it judging with a text element, if it is elements, such as `<BLOCKQUOTE>`, `<EM>`, `<STRONG>`, `<SUP>`, and `<SUB>`, and it progressing to a step (6-3), and, If it is elements, such as `<IMG>`, `<MAP>`, `<AREA>`, `<OBJECT>`, and `<APPLET>`, it will judge with an image and will progress to a step (6-6).

[0088]And it is a case where it is judged with it being an element of a text in a step (6-5) from a



step (6-3), and the locating position to the discrete character in a text element is determined.

[0089]Although divided into a block element and an in-line element among text areas, as a block element, there are a <H1>- <H6> and <P> element etc. and there are <EM>, <STRONG>, etc. as an in-line element. An in-line element is used, when emphasizing a certain character string in a text as a child element of a block element or changing a color.

[0090]As a configuration method of the block element of a text, the embezzlement region of a text area is incorporated first. The embezzlement region of the cell determined at the step (6-1) turns into an embezzlement region of the target text here.

[0091]First, in a step (6-3), about the size of a character, when specified with the property of CSS which is the specification of W3C, the value is received, When the size in particular of a character is not specified, let the value to which the rate of scaling for which it asked at the step (5-3) or the step (6-7) was applied be a size of character size to the character size of the standard searched for at the step (5-1).

[0092]And since it confirms whether set as the larger value than the minimum size beforehand set up at the step (5-10), the size of the character size determined at this time is saved.

[0093]And it arranges the character of one character at a time with the character size determined in the step (6-4), and the clinch of a character is performed in the place exceeding an embezzlement region, and the continuation is arranged from the head of the following line. As a configuration method of the in-line element of a text, When making into a reference point the end point of the locating position of the character in front of [ of the character string specified as in-line ] one, arranging, going by the character type and character size which were specified with the element from there according to the pitch information of each character and finishing arranging all the characters, In a step (6-5), the height of a field is calculated from the number of lines, and a font size.

[0094]At this time, the size of spacing sets up the value of that spacing by making a certain fixed value into a standard to the height of character, when are specified with the property of CSS and there is no specification in particular according to it.

[0095]On the other hand, at a step (6-2), it is a case where it is judged with it being an element of an image, and it progresses to a step (6-6), and the determination of the field of an image element and the determination of a locating position are processed. In this embodiment, the size of an image area applies the aspect ratio of the size specified in the XHTML document to the embezzlement region of the cell for which it asked at the step (6-1), and the deciding method of the size of an image area finds height.

[0096]And it confirms whether the cell which should be processed further exists in a step (6-8), when it judges with a cell existing, it returns to a step (6-2), and same processing is performed, and processing is ended when it judges with a cell not existing.

[0097]Drawing 11 is a flow chart which shows an example of the 3rd data-processing procedure in the information processor concerning this invention, and corresponds to the detailed level procedure of the resetting processing of the layout of each block according to the minimum check of the font size of a step (5-8) and it which showed drawing 10. - (7-1) (7-5) shows each step.

[0098]First, it asks for the size of the standard font size of each block of the rate of scaling of each block searched for at the step (6-7) shown in the standard font size, the step (5-3), or drawing 10 for which it asked at the step (5-1) shown in drawing 9 in origin in a step (7-1). As a calculation method, it becomes a rate of standard font size x scaling simply.

[0099]And in a step (7-2), the value of the size of the standard font size of each block calculated at the step (7-1) is compared, and the value of the smallest font size is extracted.

[0100]And in a step (7-3), the minimum of the standard font size set up beforehand is compared with the minimum font size extracted at the step (7-2), When the extracted minimum font size judges whether it is smaller than the minimum of a standard font size and judges with it being large, since it is not necessary to process in particular, processing is ended here.

[0101]On the other hand, when judged with the minimum font size extracted at the step (7-2) being smaller than the minimum of a standard font size at a step (7-3), Since the evil of a font becoming small too much and being unable to read comes out even if an output font becomes

small too much and prints, Since it is necessary to expand to the minimum of a standard font size, it progresses to a step (7-4), magnifying-power calculation to which the minimum font size for which it asked at the step (7-2) is expanded to the minimum of a standard font size is performed, and it asks for magnifying power.

[0102]Next, in a step (7-5), the font size of all the blocks, a locating position coordinate value, width, height of a field, etc. are multiplied in the magnifying power for which it asked at the step (7-4), regulated treatment of each block output size which extends a whole field is performed, and processing is ended.

[0103]Thereby, as shown in drawing 12, a document by which it reduced to the size OUT ((a) of drawing 12) of the specification output paper forcibly, and the character was crushed also becomes possible [ extending two or more pages to P1-P4, as shown in (b) of drawing 12 ]. And in the printer side, it will output by dividing into two or more pages the field which was able to be extended.

[0104]When it has a double-side printing function at the time of the output in a printer, the specification state in double-side printing mode may be judged, and it may constitute so that it may output to the rear surface of the paper of two sheets by dividing into two or more pages.

[0105]If according to the above-mentioned embodiment it does not fit in the paper size of an output paper but is going to store a field in what is printed by carrying out Oba, and a field since it is not created being conscious of output paper size when it is going to print an HTML file, Solve the problem of becoming small and it becoming impossible to read a character etc., and it carries out based on the size of the data and the output paper which are specified by the relative coordinate of the document data of HTML, Since assignment of a suitable field and the size of a character are assigned, it becomes possible to perform a layout suitable for the power range to a printer.

[0106]The printing system which can apply the information processor hereafter applied to this invention with reference to the memory map shown in drawing 13 explains the composition of the data processing program which can be read.

[0107]Drawing 13 is a figure explaining the memory map of the storage which stores the various data processing program which can be read with the printing system which can apply the information processor concerning this invention.

[0108]Although it does not illustrate in particular, the information by which the information which manages the program group memorized by the storage, for example, version information, a maker, etc. are remembered and for which it depends on OS by the side of program read-out, etc., for example, the icon etc. which carry out the discrimination expression of the program, may be memorized.

[0109]The data subordinate to various programs is also managed to the above-mentioned directory. The program for installing various programs in a computer, the program thawed when the program to install is compressed, etc. may be memorized.

[0110]The function shown in drawing 9 in this embodiment - drawing 11 may be carried out with the host computer by the program installed from the outside. And this invention is applied even when an information group including a program is supplied by the output unit from an external storage via storages, such as CD-ROM, a flash memory, and FD, or a network in that case.

[0111]As mentioned above, the storage which recorded the program code of the software which realizes the function of an embodiment mentioned above, Also when a system or a device is supplied and the computer (or CPU and MPU) of the system or a device reads and executes the program code stored in the storage, it cannot be overemphasized that the purpose of this invention is attained.

[0112]In this case, the program code itself read from the storage will realize the new function of this invention, and the storage which memorized that program code will constitute this invention.

[0113]As a storage for supplying a program code, a floppy disk, a hard disk, an optical disc, a magneto-optical disc, CD-ROM, CD-R, magnetic tape, a nonvolatile memory card, ROM, EEPROM, etc. can be used, for example.

[0114]By executing the program code which the computer read, Based on directions of the

program code the function of an embodiment mentioned above is not only realized, but, It cannot be overemphasized that it is contained also when the function of an embodiment which performed a part or all of processing that OS (operating system) etc. which are working on a computer are actual, and was mentioned above by the processing is realized.

[0115]After the program code read from the storage was written in the memory with which the function expansion unit connected to the expansion board inserted in the computer or the computer is equipped, It cannot be overemphasized that it is contained also when the function of an embodiment which performed a part or all of processing that CPU etc. with which the expansion board and function expansion unit are equipped are actual, based on directions of the program code, and was mentioned above by the processing is realized.

[0116]

[Effect of the Invention]As explained above, according to the 1st concerning this invention – the 15th invention, the element of a block is analyzed for every attribute, Format conversion is carried out to the document file of the layout form which can be printed as character size more than the minimum character size to which the text data in a document file is set beforehand, Based on the data and the size of an output paper according to each attribute of the document specified by the relative coordinate, by assigning assignment of a suitable field, and the size of a character, Since it is not created being conscious of output paper size, if it does not fit in the paper size of an output paper but is going to store a field in what is printed by carrying out Oba, and a field, The situation where it becomes small and it becomes impossible to read a character is avoided, and the effect which can generate the document file which had the layout which was suitable for the power range to a printer from the document file which consists of several blocks with which the attributes as which a layout is not specified differ performed is done so.

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[Translation done.]

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**TECHNICAL FIELD**

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[Field of the Invention]This invention relates to the information processor, information processing method, and storage which can process the document file which consists of several blocks with which the attributes as which a layout is not specified differ.

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**PRIOR ART**

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[Description of the Prior Art]In recent years, with the spread of communication media, such as the Internet, Web on a network is accessed from information processors, such as a personal computer, the information on various homepages is perused, the information considered as a request is downloaded, and the opportunity to print from various printers is increasing.

[0003]Under the present circumstances, the document data described in the HTML (HyperText Markup Language) form used as exchange document data of Web, Or the document data described in the XML (Extensible Markup Language) form expected as a standard format of document data from now on will be printed from the printer connected with the network from the server. In this case, in the information processor treating the data of HTML, a paper size, resolution, etc. at the time of an output are created by the data of HTML in many cases, without being conscious.

[0004]call the contents of the HTML file a browser -- it and, [ \*\*\*\*\*-inspection-] For example, when area size is changed by Internet Explorer by Microsoft Corp., Netscape Communications Netscape Navigator, etc., It is defined as the ability also of a layout to change according to the changed field at the relative coordinate value or a rate in many cases.

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**EFFECT OF THE INVENTION**

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[Effect of the Invention]As explained above, according to the 1st concerning this invention - the 15th invention, the element of a block is analyzed for every attribute, Format conversion is carried out to the document file of the layout form which can be printed as character size more than the minimum character size to which the text data in a document file is set beforehand, Based on the data and the size of an output paper according to each attribute of the document specified by the relative coordinate, by assigning assignment of a suitable field, and the size of a character, Since it is not created being conscious of output paper size, if it does not fit in the paper size of an output paper but is going to store a field in what is printed by carrying out Oba, and a field, The situation where it becomes small and it becomes impossible to read a character is avoided, and the effect which can generate the document file which had the layout which was suitable for the power range to a printer from the document file which consists of several blocks with which the attributes as which a layout is not specified differ performed is done so.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention]However, since it is not created being conscious of output paper size when it is going to print the above-mentioned HTML file with a printer, there is a problem of the sizes of the expected thing and an output differing and being printed.

[0006]For example, it did not fit in the paper size of an output paper, but when it was going to store the field in what is printed by carrying out Oba, and a field, there was a problem of becoming small and it becoming impossible to read a character etc.

[0007]Were made in order that this invention might solve the above-mentioned problem, and the element of a block is analyzed for every attribute, Format conversion is carried out to the document file of the layout form which can be printed as character size more than the minimum character size to which the text data in a document file is set beforehand, Based on the data and the size of an output paper according to each attribute of the document specified by the relative coordinate, by assigning assignment of a suitable field, and the size of a character, It is providing the information processor, information processing method, and storage which can generate the document file which had the layout which was suitable for the power range to a printer from the document file which consists of several blocks with which the attributes as which a layout is not specified differ performed.

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MEANS

[Means for Solving the Problem]The 1st invention concerning this invention is an information processor which can process a document file which consists of several blocks with which attributes as which a layout is not specified differ, and analyzes an element of said block of each for every attribute, So that it may print with character size more than the minimum character size to which text data in said document file is set beforehand. It has an arrangement means (equivalent to data processing by CPU101 shown in drawing 2) which arranges an element of each block to two or more power ranges determined with a paper size of a printer.

[0009]The 2nd invention concerning this invention said arrangement means, A setting-out means (equivalent to data processing by CPU101 shown in drawing 2) to set up output paper size to said document file, A determination means (equivalent to data processing by CPU101 shown in drawing 2) to determine size of each block based on output paper size set up by said setting-out means, A magnification determination means (equivalent to data processing by CPU101 shown in drawing 2) to ask for a rate of scaling of a power range and character size based on size of each block determined by said determination means, A calculating means which calculates character size of each block based on a rate of scaling called for by said magnification determination means, It asks for a font size by said calculating means from all the blocks, When it judges that it is smaller than a font size to which the minimum font size was beforehand set by judging means (equivalent to data processing by CPU101 shown in drawing 2) to judge, and said judging means whether the minimum font size is larger than a font size set up beforehand, It has a magnification means (equivalent to data processing by CPU101 shown in drawing 2) to which size of each block is expanded to the minimum font size set up beforehand.

[0010]In the 3rd invention concerning this invention, said attribute includes a text, an image, and a table.

[0011]Said minimum font size enables setting out of arbitrary sizes of the 4th invention concerning this invention.

[0012]In the 5th invention concerning this invention, said document file includes HTML form, XML form, and extended format of HTML form or XML form.

[0013]The 6th invention concerning this invention is an information processing method in an information processor which can process a document file which consists of several blocks with which attributes as which a layout is not specified differ, and analyzes an element of said block of each for every attribute, So that it may print with character size more than the minimum character size to which text data in said document file is set beforehand. It has an arrangement process (Step 5-1 to 5-11 shown in drawing 9) which arranges an element of each block to two or more power ranges determined with a paper size of a printer.

[0014]The 7th invention concerning this invention said arrangement process, A setting-out process (not shown) of setting up output paper size to said document file, A decision process (Step 5-3 shown in drawing 9) which determines size of each block based on output paper size set up by said setting-out process, A magnification decision process (Step 5-3 shown in drawing 9) which asks for a rate of scaling of a power range and character size based on size of each block determined by said decision process, A calculation process (Step 6-3 shown in drawing 10) which calculates character size of each block based on a rate of scaling called for by said



magnification decision process, A determination process (Step 7-3 shown in drawing 11) which asks for a font size according to said calculation process from all the blocks, and judges whether the minimum font size is larger than a font size set up beforehand, When it judges with it being smaller than a font size to which the minimum font size was beforehand set by said determination process, it has an expansion process (Step 7-5 shown in drawing 11) to which size of each block is expanded to the minimum font size set up beforehand.

[0015]In the 8th invention concerning this invention, said attribute includes a text, an image, and a table.

[0016]Said minimum font size enables setting out of arbitrary sizes of the 9th invention concerning this invention.

[0017]In the 10th invention concerning this invention, said document file includes HTML form, XML form, and extended format of HTML form or XML form.

[0018]The 11th invention concerning this invention analyzes an element of said block of each for every attribute to an information processor which can process a document file which consists of several blocks with which attributes as which a layout is not specified differ, So that it may print with character size more than the minimum character size to which text data in said document file is set beforehand. A program for performing an arrangement process which arranges an element of each block to two or more power ranges determined with a paper size of a printer is made to record on a recording medium so that reading of a computer is possible.

[0019]The 12th invention concerning this invention said arrangement process, A setting-out process (not shown) of setting up output paper size to said document file, A decision process (Step 5-3 shown in drawing 9) which determines size of each block based on output paper size set up by said setting-out process, A magnification decision process (Step 5-3 shown in drawing 9) which asks for a rate of scaling of a power range and character size based on size of each block determined by said decision process, A calculation process (Step 6-3 shown in drawing 10) which calculates character size of each block based on a rate of scaling called for by said magnification decision process, A determination process (Step 7-3 shown in drawing 11) which asks for a font size according to said calculation process from all the blocks, and judges whether the minimum font size is larger than a font size set up beforehand, When it judges with it being smaller than a font size to which the minimum font size was beforehand set by said determination process, it has an expansion process (Step 7-5 shown in drawing 11) to which size of each block is expanded to the minimum font size set up beforehand.

[0020]In the 13th invention concerning this invention, said attribute includes a text, an image, and a table.

[0021]Said minimum font size enables setting out of arbitrary sizes of the 14th invention concerning this invention.

[0022]As for the 15th invention concerning this invention, said document file performs \*\*\*\* for HTML form, XML form, and extended format of HTML form or XML form.

[0023]

[Embodiment of the Invention]Drawing 1 is a figure explaining the composition of the document printing system which can apply the information processor of this invention.

[0024]In drawing 1, this system Two or more personal computers (henceforth a client personal computer) X and Y. It has one set of one set of file server FS, and Web server WS, and the composition that the printer A which can process at least one set of XML data was connected by the network N.

[0025]And without mobile terminal M like a Personal Digital Assistant connecting with the printer A through direct IrDA, RS-232C, Centronics, etc. at a network, it is connected so that the printer A and communication are possible.

[0026]It is also possible to connect information processors, such as a word processor, a workstation, and a Personal Digital Assistant, instead of the client personal computers X and Y. A font data group, data of Web, image data, etc. which the client personal computers X and Y and file server FS require for two or more sorts of fonts are stored.

[0027]The printing demand of URL of web, print copies, etc. to print to the printer A is advanced from mobile terminal M or the client personal computer X or Y by this system, A file request is

advanced from the printer A to Web server WS, Web server WS collects required document data, font data, etc. from file server FS, and transmits them to the printer A, and the printer A prints by developing the transmitted data.

[0028]Drawing 2 is a block diagram showing the outline composition of the client personal computers X and Y, file server FS, and Web server WS shown in drawing 1.

[0029]In drawing 2, 101 is CPU, i.e., a central processing unit, and performs control, data processing, etc. of this whole device. 102 is ROM and memorizes the character pattern data for a system startup program and transliterations, etc. 103 is RAM and stores temporarily the result of an operation of data [ which is used for the operation of CPU101 ], and CPU101.

[0030]104 is a keyboard control section (KBC), from the keyboard (KB) 105, receives key ON KADETA (a character code and a control code), and transmits it to CPU101. 106 is a controlling-display part (CRTC), reads the display information stored in RAM103, i.e., the bitmapped image changed from the character code, and transmits it to CRT107. From CRTC106, CRT107 receives a bitmapped image and displays it on a display screen.

[0031]108 is a disk control section (DKC) and controls the data communications of the external storage 109, etc. 109 is an external storage and comprises a FD, i.e., a floppy (registered trademark) disk unit, HD, i.e., a hard disk drive, or a CD-ROM. A program and data are stored in the external storage 109, and CPU101 refers to stored data if needed, or is loaded to RAM103.

[0032]110 is a network control section (NTC) and performs communication operation control of the network device (NT) 111. 112 is a system bus and performs data transfer between above-mentioned components.

[0033]Drawing 3 is a figure showing an example of the memory map of RAM103 shown in drawing 2, and corresponds to the memory map in the system configuration shown in drawing 1.

[0034]In drawing 3, this device operates by performing operating systems, such as a basic I/O program and a window system, and application used as processing of this invention. The basic I/O program is stored in ROM102 shown in drawing 1. The operating system is stored in the hard disk (HD) shown in the external storage 109 shown in drawing 1. And when a power supply is turned on, an operating system is read into RAM from HD with the IPL (initializing program loading) function in a basic I/O program, and the operation is started.

[0035]The program and associated data concerning this invention are supplied via storages, such as a floppy disk (FD) in the external storage 109 shown in drawing 1, or CD-ROM. And by once carrying out HD HEIN stole of a program and the associated data from FD or CD-ROM, It is also possible to carry out a RAM load and to perform from direct FD or CD-ROM, without becoming possible from HD to load to RAM103 and to perform, or carrying out HD HEIN stole.

[0036]In drawing 3, 210 is a basic I/O program and shows the state where it was loaded to RAM103 and execution became possible from the ROM102 grade.

[0037]211 shows the state where operating systems, such as a window system, were loaded to RAM103, and execution of them was attained. 212 shows the state where application including the program of this invention, etc. was loaded to RAM103, and execution of it was attained.

[0038]213 is associated data, the state where it was loaded to RAM103 and execution became possible is shown, and 214 is a work area which each program uses.

[0039]A basic I/O program is read into RAM103 by the system startup program in ROM102. An application program and where the hard disk drive HEIN stole of the associated data is once carried out [ CD-ROM / the floppy disk drive unit as the external storage 109, or ], when a power supply is turned on, By loading to RAM103 from a hard disk drive, it becomes possible to perform.

[0040]It is also possible to load to RAM103 and to perform from a direct floppy disk drive unit or CD-ROM, without carrying out a hard disk drive HEIN stole. The below-mentioned printer information table is formed in the field of associated data in file server FS.

[0041]Drawing 4 shall be a block diagram explaining the composition of the printer A shown in drawing 1, and via the network device 111 and network device of a document processing system which were shown in drawing 2, shall be constituted so that communication is possible.

[0042]the output engines in this system may be laser beam printers — it may carry out and they may be output engines, such as a bubble jet (registered trademark) printer or hot printing, — it is

-- \*\* It has a function which can carry out the printing job of XML form document data, graphic data, tabular format data, and the image data.

[0043]In drawing 4, 211 is CPU and performs control, data processing, etc. of this whole device. 212 is ROM and has memorized the character pattern data according to the system startup program which CPU211 should execute, and style of handwriting, etc.

[0044]213 is RAM, is a data storage area without use restrictions, and is a field which each program and data are loaded and is performed for every various processings.

[0045]215 is a printer controller (PRTC) and 216 is printer engine (PRT). 214 is a system bus and should become a passage of the data between above-mentioned components. 217 is a disk controller (DKC) and controls data write access or data read access from the hard disk 218 to the hard disk 218.

[0046]219 is a network control section (NTC) and performs motion control of the network device (NT) 220. Character pattern data (font data) etc. are stored in ROM212. And document data, image data or font data required of Web server WS is downloaded and stored in RAM213 or HD217 from Web server WS.

[0047]CPU211 generates character pattern data and image data (bit map data) according to the program which is in ROM212 about the document data, image data, or font data supplied from Web server WS, It develops to the printing buffer in the printer controller 215.

[0048]The printer controller 215 outputs the printing control signal generated based on bit map data to the printer engine 216. The network controller 217 is controlling operation of the client personal computers X and Y and the file servers FS and the network device at the time of performing data transmission and reception in between (NT)218 via the network N shown in drawing 1.

[0049]Drawing 5 is a block diagram explaining the conversion process state of the document in the information processor concerning this invention.

[0050]The flow of this processing is divided into the processing by the side of a host, and the processing by the side of a printer, and processing by the side of a host is performed on Web server WS shown in drawing 1, or is processed with the client personal computer X or the client personal computer Y.

[0051]This processing reads the document saved by the document first saved by XML form from file server FS shown in drawing 1, or HTML form, It is once changed into the data of the form of XHTML (ExtensibleHyper Text Markup Language). And it changes into SVG (Scalable Vector Graphic) which performs a suitable layout according to output paper size or resolution according to the flow chart shown in drawing 9 from there.

[0052]The contents of XHTML and SVG are indicated in the technical report of W3C. XHTML extends the grammar of HTML according to XML form, and is fundamentally suitable for display processing.

[0053]On the other hand, like the grammar of page description, such as PS (Adobe Post Script), XML extension is carried out and SVG is suitable for the output format. Therefore, the document data of HTML or XML is once changed into XHTML, and output paper size and resolution are obtained further there, and it changes into the data of SVG form, and transmits by the PURINTAHE SVG file as which SVG can interpret it. By doing so, it becomes possible to arrange appropriately the document data which was able to be applied in XML or HTML, and to output it.

[0054]Drawing 6 is a figure explaining the example of a document of the XHTML form shown in drawing 5, drawing 7 is a figure explaining the layout structure of the example of a document of the XHTML form shown in drawing 6, and drawing 8 is a figure explaining the example of a SVG conversion list of the document of the XHTML form shown in drawing 7.

[0055]Next, according to the flow chart shown in drawing 9, the detailed flow of the processing changed into document data (document) including the picture of SVG form, etc. from the document data of the XHTML form in the information processor concerning this invention is explained.

[0056]Drawing 9 is a flow chart which shows an example of the 1st data-processing procedure in the information processor concerning this invention. - (5-1) (5-11) shows each step.

[0057]First, it asks for the font size which serves as a standard of conversion out of the data of

the XHTML form which becomes a changing agency in a step (5-1). The font size in particular used as a standard is not specified by the file of XHTML.

[0058]Therefore, although each browser has defined the standard font size uniquely in many cases, values, such as 10 point or 10.5 etc. points, are defined as a standard font size to an output paper here.

[0059]When the standard font size has entered into an XHTML document, the value is defined as a standard font size.

[0060]Next, the whole XHTML document is checked in a step (5-2). When it investigates whether there is any attribute of a table, the maximum horizontal size table is extracted and there is no attribute of a table, the embezzlement region of the size of a predetermined paper to output or a screen serves as size used as the standard of the embezzlement region of the tag which is each XHTML element.

[0061]On the other hand, when the attribute of a table exists, the contents of each table are compared. For example, since the value turns into a value of the width of a table when the attribute of width suits the element of <TABLE> of XHTML, the value chooses the greatest thing.

[0062]On the other hand, when there is no attribute of width in the element of <TABLE>, the embezzlement region of a power range turns into an embezzlement region of the table.

[0063]Next, in a step (5-3), the rate of scaling of a power range is calculated from the maximum of the table extracted at the step (5-2) (calculation). A calculation method can be searched for from the ratio of the embezzlement region of a power range, and the maximum embezzlement region of the table for which it asked at the step (5-2). That is, it becomes the maximum embezzlement region of the embezzlement region / table of a rate of scaling = power range.

[0064]And in order to calculate arrangement of each element, the locating position of the character within an element, etc. after a step (5-4), in a step (5-4), it is judged whether the target element is a table element first, whether it is a text element, and whether it is an image element.

[0065]Here, as an example of a table element, there are <TABLE>, <TR>, <TH>, <TD>, <CAPTION>, <THEAD>, <TFOOT>, <TBODY>, etc. As a text element, there are <H1>- <H6>, <P>, <Q>, <BLOCKQUOTE>, <EM>, <STRONG>, <SUP>, a <SUB>, etc.

[0066]And as image element LEO, there are <IMG>, <MAP>, <AREA>, <OBJECT>, <APPLET>, etc. The specification of XHTML indicated about the meaning of each element to address [ on WWW ], for example, <http://WWW.W3.org/TR/xhtml1/>, It shall apply to the specification of HTML indicated to <http://www.w3.org/TR/htm140/>.

[0067]And when it judges with it progressing to a step (5-6), and being an element of an image, when it judges with it progressing to a step (5-5), and being an element of a text, when judged with the target element being an element of a table, it is step (5-7) HE \*\*\*\*.

[0068]And in a step (5-5), it is a case where it is judged with it being an element of a table, and arrangement in a table is performed. Since the details of processing here are explained in detail using the flow chart shown in drawing 10, explanation here is omitted.

[0069]On the other hand, in a step (5-6), it is a case where it is judged with it being an element of a text, and the locating position to the discrete character in a text element is determined.

Although divided into a block element and an in-line element among text areas, there are a <H1>- <H6> and <P> element etc. as a block element. There are <EM>, <STRONG>, etc. as an in-line element. An in-line element is used, when emphasizing a certain character string in a text as a child element of a block element or changing a color.

[0070]As a configuration method of the block element of a text, the embezzlement region of a text area is determined first.

[0071]Here, the embezzlement region of the parent element of a text element will call it the embezzlement region of a text area. For example, since it will call it the top element if a parent element is <XHTML>, the embezzlement region of the size of a paper or a screen which should be outputted is set up as an embezzlement region of a text area.

[0072]And when specified about the size of a character with the property of CSS which is the specification of the above-mentioned W3C. When the size in particular of a character is not

specified to the value, let the value to which the rate of scaling for which it asked at the step (5-3) was applied be a size of character size to the character size of the standard searched for at the step (5-1).

[0073]And since it confirms whether the size of the character size determined at this time is set as the larger value than the minimum size which is a step (5-10) mentioned later, and was set up beforehand, it saves. And the character is arranged a single character every with the determined character size, the clinch of a character is performed in the place exceeding an embezzlement region, and the continuation is arranged from the head of the following line. And when finishing arranging all the characters, the height of a field is calculated from the number of lines and font size at that time. At this time, the size of spacing sets up the value of that spacing by making a certain fixed value into a standard to the height of character, when are specified with the property of CSS and there is no specification in particular according to it.

[0074]As a configuration method of the in-line element of a text, the end point of the locating position of the character in front of [ of the character string specified as in-line ] one is made into a reference point, and it arranges according to the pitch information of each character with the character type and character size which were specified with the element from there.

[0075]On the other hand, in Step 5-7, it is a case where it is judged with it being an element of an image, and the determination of the field of an image element and the determination of a locating position are processed. In this embodiment, the deciding method of the size of an image area becomes the area size to which the rate of scaling for which the size of the image area asked at the step (5-3) from the size specified in the XHTML document was applied.

[0076]And in a step (5-8), the contents of each element searched for at the step (5-7) are changed into SVG data from a step (5-5). At this time, the element of a text is changed into `<tspan>` and an image element is changed into `<image>`.

[0077]Thereby, the data of the layout shown, for example in drawing 7 was expressed with the document of XHTML shown in the drawing 6 figure, and when it was expressed by SVG, it came to be shown in drawing 8.

[0078]Next, in a step (5-9), it confirms whether processing of a step (5-5) to the step (5-7) was completed to all the elements, and when it is judged that processing has not been completed yet, the locating position of each element is calculated by returning to a step (5-4).

[0079]On the other hand, when it judges with processing being completed to all the elements at the step (5-9), the result to which arrangement in each element and calculation of the font size were carried out is seen at a step (5-10), and the minimum of the size of the font which should be outputted is checked. And since it cannot be too small even if it prints when the data of a font size smaller than the font size set up beforehand exists, processing (for details, it explains in detail using the flow chart shown in drawing 10) which enlarges a whole field is performed.

[0080]And in a step (5-11), the whole back document by which the locating position of all the elements was calculated is surrounded by `<svg>` and `</svg>`, the `<style>` element defines a style sheet if needed, and creation processing of a svg document is ended.

[0081]Drawing 10 is a flow chart which shows an example of the 2nd data-processing procedure in the information processor concerning this invention, and corresponds to the detailed level procedure which calculates the locating position of the contents of the table of the step (5-5) shown in drawing 9. - (6-1) (6-8) shows each step.

[0082]First, at a step (6-1), the embezzlement region of each cell in a table is calculated. In this embodiment, the calculation method of the embezzlement region of each cell totals the area size of each cell surrounded with the `<TR>` element, and assigns the embezzlement region of the table element which is a parent element according to the rate of each cell.

[0083]For example, in "10" and the cell 2, "20" and the cell 3 as a child element of a certain table in the document of XHTML by "10". [ a cell ] [ those with three, and the embezzlement region of each cell ] [ the cell 1 ] When the embezzlement region of the table of a parent element is "100", the embezzlement region of the cell 1 is set to  $100 \times (10/40) = 25$ , and, in the embezzlement region of the cell 2, "50" and the embezzlement region of the cell 3 are set to "25" in a similar manner.

[0084]Next, in the step (6-2), when it is a table further and a text as contents which check the

contents of each cell, it may be an image.

[0085]And each judgment method like the method described at the step (5-4) shown in drawing 9, If it is elements, such as <TABLE>, <TR>, <TH>, <TD>, <CAPTION>, <THEAD>, <TFOOT>, and <TBODY>, will judge with a table element, and progress to a step (6-7), and the rate of scaling is re-calculated, It returns to a step (6-1), and a table element is processed in recovery.

[0086]A step (6-7) is a case where it is judged with it being an element of a table further in a cell, and since it has asked for the size of the cell used as the parent element of the target table at the step (6-1), it needs to change the size of a table so that it may fit in the size. And the calculation method at that time serves as breadth of the cell of the transverse size / parent element of the expansion  $\text{*****} \times \text{table of the table of a rate of scaling} = \text{parent element}$ .

[0087]On the other hand, at a step (6-2), <H1>- <H6>, <P>, <Q>, it judging with a text element, if it is elements, such as <BLOCKQUOTE>, <EM>, <STRONG>, <SUP>, and <SUB>, and it progressing to a step (6-3), and, If it is elements, such as <IMG>, <MAP>, <AREA>, <OBJECT>, and <APPLET>, it will judge with an image and will progress to a step (6-6).

[0088]And it is a case where it is judged with it being an element of a text in a step (6-5) from a step (6-3), and the locating position to the discrete character in a text element is determined.

[0089]Although divided into a block element and an in-line element among text areas, as a block element, there are a <H1>- <H6> and <P> element etc. and there are <EM>, <STRONG>, etc. as an in-line element. An in-line element is used, when emphasizing a certain character string in a text as a child element of a block element or changing a color.

[0090]As a configuration method of the block element of a text, the embezzlement region of a text area is incorporated first. The embezzlement region of the cell determined at the step (6-1) turns into an embezzlement region of the target text here.

[0091]First, in a step (6-3), about the size of a character, when specified with the property of CSS which is the specification of W3C, the value is received, When the size in particular of a character is not specified, let the value to which the rate of scaling for which it asked at the step (5-3) or the step (6-7) was applied be a size of character size to the character size of the standard searched for at the step (5-1).

[0092]And since it confirms whether set as the larger value than the minimum size beforehand set up at the step (5-10), the size of the character size determined at this time is saved.

[0093]And it arranges the character of one character at a time with the character size determined in the step (6-4), and the clinch of a character is performed in the place exceeding an embezzlement region, and the continuation is arranged from the head of the following line. As a configuration method of the in-line element of a text, When making into a reference point the end point of the locating position of the character in front of [ of the character string specified as in-line ] one, arranging, going by the character type and character size which were specified with the element from there according to the pitch information of each character and finishing arranging all the characters, In a step (6-5), the height of a field is calculated from the number of lines, and a font size.

[0094]At this time, the size of spacing sets up the value of that spacing by making a certain fixed value into a standard to the height of character, when are specified with the property of CSS and there is no specification in particular according to it.

[0095]On the other hand, at a step (6-2), it is a case where it is judged with it being an element of an image, and it progresses to a step (6-6), and the determination of the field of an image element and the determination of a locating position are processed. In this embodiment, the size of an image area applies the aspect ratio of the size specified in the XHTML document to the embezzlement region of the cell for which it asked at the step (6-1), and the deciding method of the size of an image area finds height.

[0096]And it confirms whether the cell which should be processed further exists in a step (6-8), when it judges with a cell existing, it returns to a step (6-2), and same processing is performed, and processing is ended when it judges with a cell not existing.

[0097]Drawing 11 is a flow chart which shows an example of the 3rd data-processing procedure in the information processor concerning this invention, and corresponds to the detailed level procedure of the resetting processing of the layout of each block according to the minimum

check of the font size of a step (5-8) and it which showed drawing 10. - (7-1) (7-5) shows each step.

[0098]First, it asks for the size of the standard font size of each block of the rate of scaling of each block searched for at the step (6-7) shown in the standard font size, the step (5-3), or drawing 10 for which it asked at the step (5-1) shown in drawing 9 in origin in a step (7-1). As a calculation method, it becomes a rate of standard font size x scaling simply.

[0099]And in a step (7-2), the value of the size of the standard font size of each block calculated at the step (7-1) is compared, and the value of the smallest font size is extracted.

[0100]And in a step (7-3), the minimum of the standard font size set up beforehand is compared with the minimum font size extracted at the step (7-2). When the extracted minimum font size judges whether it is smaller than the minimum of a standard font size and judges with it being large, since it is not necessary to process in particular, processing is ended here.

[0101]On the other hand, when judged with the minimum font size extracted at the step (7-2) being smaller than the minimum of a standard font size at a step (7-3), Since the evil of a font becoming small too much and being unable to read comes out even if an output font becomes small too much and prints, Since it is necessary to expand to the minimum of a standard font size, it progresses to a step (7-4), magnifying-power calculation to which the minimum font size for which it asked at the step (7-2) is expanded to the minimum of a standard font size is performed, and it asks for magnifying power.

[0102]Next, in a step (7-5), the font size of all the blocks, a locating position coordinate value, width, height of a field, etc. are multiplied in the magnifying power for which it asked at the step (7-4), regulated treatment of each block output size which extends a whole field is performed, and processing is ended.

[0103]Thereby, as shown in drawing 12, a document by which it reduced to the size OUT ((a) of drawing 12) of the specification output paper forcibly, and the character was crushed also becomes possible [ extending two or more pages to P1-P4, as shown in (b) of drawing 12 ]. And in the printer side, it will output by dividing into two or more pages the field which was able to be extended.

[0104]When it has a double-side printing function at the time of the output in a printer, the specification state in double-side printing mode may be judged, and it may constitute so that it may output to the rear surface of the paper of two sheets by dividing into two or more pages.

[0105]If according to the above-mentioned embodiment it does not fit in the paper size of an output paper but is going to store a field in what is printed by carrying out Oba, and a field since it is not created being conscious of output paper size when it is going to print an HTML file, Solve the problem of becoming small and it becoming impossible to read a character etc., and it carries out based on the size of the data and the output paper which are specified by the relative coordinate of the document data of HTML, Since assignment of a suitable field and the size of a character are assigned, it becomes possible to perform a layout suitable for the power range to a printer.

[0106]The printing system which can apply the information processor hereafter applied to this invention with reference to the memory map shown in drawing 13 explains the composition of the data processing program which can be read.

[0107]Drawing 13 is a figure explaining the memory map of the storage which stores the various data processing program which can be read with the printing system which can apply the information processor concerning this invention.

[0108]Although it does not illustrate in particular, the information by which the information which manages the program group memorized by the storage, for example, version information, a maker, etc. are remembered and for which it depends on OS by the side of program read-out, etc., for example, the icon etc. which carry out the discrimination expression of the program, may be memorized.

[0109]The data subordinate to various programs is also managed to the above-mentioned directory. The program for installing various programs in a computer, the program thawed when the program to install is compressed, etc. may be memorized.

[0110]The function shown in drawing 9 in this embodiment - drawing 11 may be carried out with

the host computer by the program installed from the outside. And this invention is applied even when an information group including a program is supplied by the output unit from an external storage via storages, such as CD-ROM, a flash memory, and FD, or a network in that case.

[0111]As mentioned above, the storage which recorded the program code of the software which realizes the function of an embodiment mentioned above, Also when a system or a device is supplied and the computer (or CPU and MPU) of the system or a device reads and executes the program code stored in the storage, it cannot be overemphasized that the purpose of this invention is attained.

[0112]In this case, the program code itself read from the storage will realize the new function of this invention, and the storage which memorized that program code will constitute this invention.

[0113]As a storage for supplying a program code, a floppy disk, a hard disk, an optical disc, a magneto-optical disc, CD-ROM, CD-R, magnetic tape, a nonvolatile memory card, ROM, EEPROM, etc. can be used, for example.

[0114]By executing the program code which the computer read, Based on directions of the program code the function of an embodiment mentioned above is not only realized, but, It cannot be overemphasized that it is contained also when the function of an embodiment which performed a part or all of processing that OS (operating system) etc. which are working on a computer are actual, and was mentioned above by the processing is realized.

[0115]After the program code read from the storage was written in the memory with which the function expansion unit connected to the expansion board inserted in the computer or the computer is equipped, It cannot be overemphasized that it is contained also when the function of an embodiment which performed a part or all of processing that CPU etc. with which the expansion board and function expansion unit are equipped are actual, based on directions of the program code, and was mentioned above by the processing is realized.

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[Translation done.]



## \* NOTICES \*

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1]It is a figure explaining the composition of the document printing system which can apply the information processor of this invention.

[Drawing 2]It is a block diagram showing the outline composition of a client personal computer, a file server, and a Web server shown in drawing 1.

[Drawing 3]It is a figure showing an example of the memory map of RAM shown in drawing 2.

[Drawing 4]It is a block diagram explaining the composition of the printer shown in drawing 1.

[Drawing 5]It is a block diagram explaining the conversion process state of the document in the information processor concerning this invention.

[Drawing 6]It is a figure explaining the example of a document of the XHTML form shown in drawing 5.

[Drawing 7]It is a figure explaining the layout structure of the example of a document of the XHTML form shown in drawing 6.

[Drawing 8]It is a figure explaining the example of a SVG conversion list of the document of the XHTML form shown in drawing 7.

[Drawing 9]It is a flow chart which shows an example of the 1st data-processing procedure in the information processor concerning this invention.

[Drawing 10]It is a flow chart which shows an example of the 2nd data-processing procedure in the information processor concerning this invention.

[Drawing 11]It is a flow chart which shows an example of the 3rd data-processing procedure in the information processor concerning this invention.

[Drawing 12]It is a figure showing the automatic-layout example output in the information processor concerning this invention.

[Drawing 13]It is a figure explaining the memory map of the storage which stores the various data processing program which can be read with the printing system which can apply the information processor concerning this invention.

### [Description of Notations]

101 CPU

102 ROM

103 RAM

104 KBC

105 KB

106 CRTC

107 CRT

108 DKC

109 External storage

110 NTC

111 NT

112 System bath

[Translation done.]

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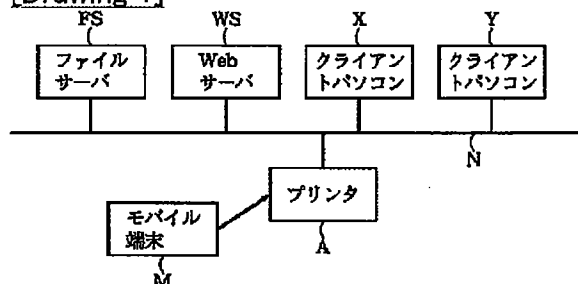
1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\* shows the word which can not be translated.

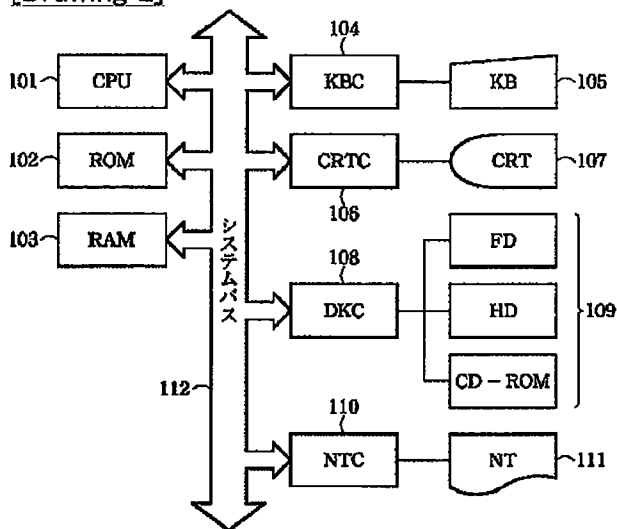
3.In the drawings, any words are not translated.

## DRAWINGS

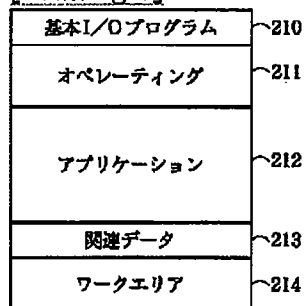
[Drawing 1]



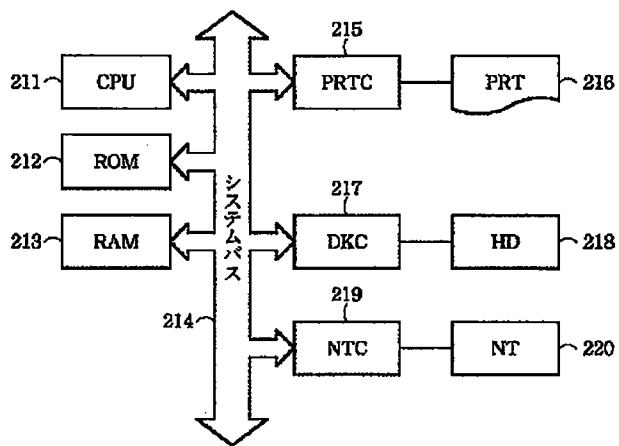
[Drawing 2]



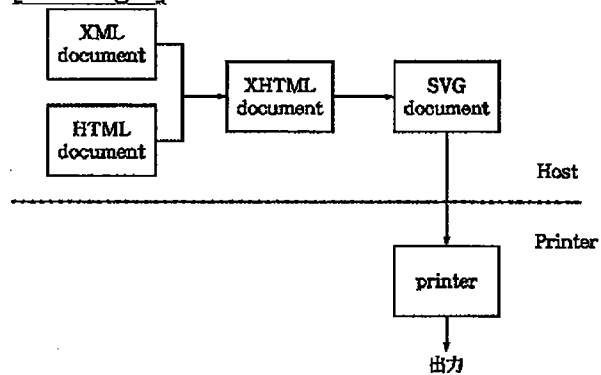
[Drawing 3]



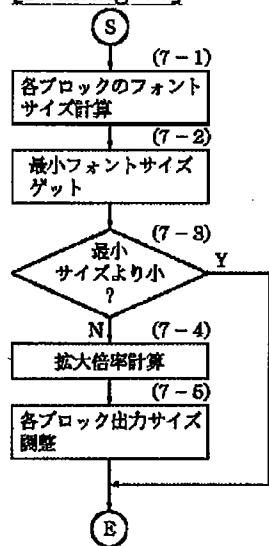
[Drawing 4]



[Drawing 5]



[Drawing 11]



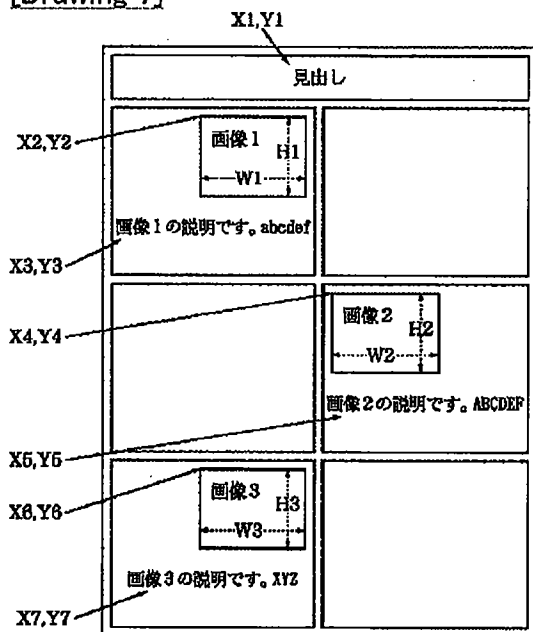
[Drawing 6]

```

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  <tr>
    <td align="center"="2"width="50%"><font size="6"><em>見出し</em></font></td>
  </tr>
  <tr>
    <td align="right"width="50%">
    <br><br>
    画像1の説明です。abcdef.....
  </td>
  <td align="right"width="50%"></td>
  </tr>
  <tr>
    <td width="50%"></td>
    <td width="50%">
    <br><br>
    画像2の説明です。ABCDEF
  </td>
  </tr>
  <tr>
    <td align="right"width="50%">
    <br><br>
    画像3の説明です。XYZ
  </td>
  <td width="50%"></td>
  </tr>
</table>
</html>

```

[Drawing 7]



[Drawing 8]

```

<svg>
  <next font-family:gothic font-size:20pt font-weight:bold font-style:italic x=X1 y=Y1>
  見出し
  </next>
  <image x=X2 y=Y2 width=W1 height=H1>
  画像1.jpg
  </image>
  <text font-family:mincho font-size:10pt x=X3 y=Y3>
  画像1の説明です。abcdef.....
  </next>
  <image x=X4 y=Y4 width=W2 height=H2>
  画像2.jpg
  </image>
  <text font-family:mincho font-size:10pt x=X5 y=Y5>
  画像2の説明です。ABCDEF.....
  </text>
  <image x=X6 y=Y6 width=W3 height=H3>
  画像3.jpg
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  </text>
</svg>

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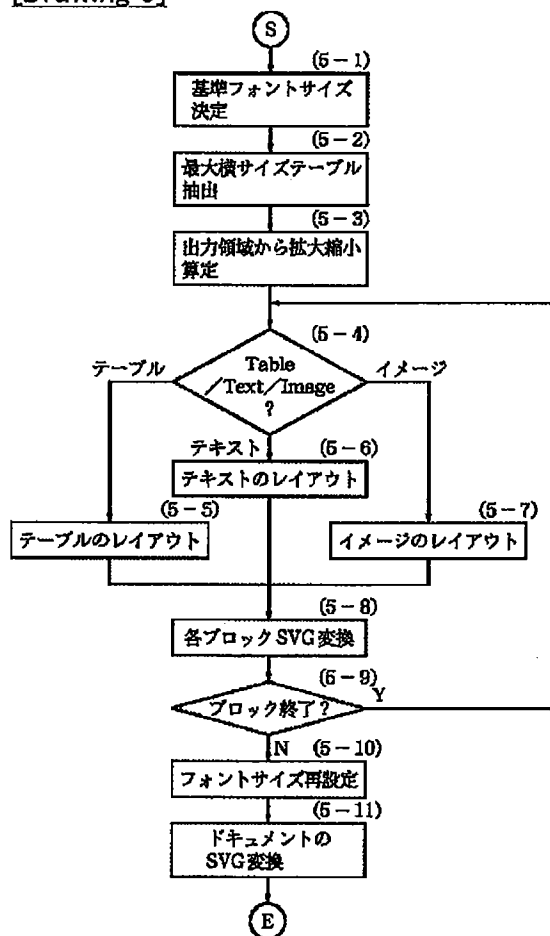
[Drawing 13]

FD/CD-ROM等の記憶媒体

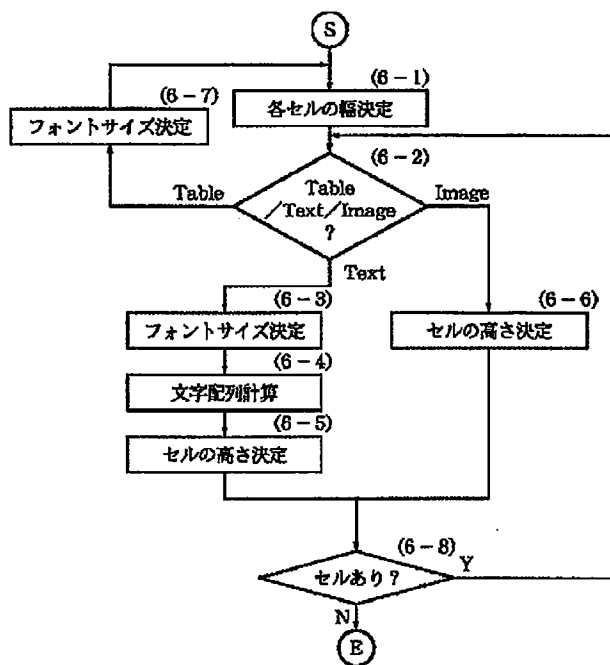
ディレクトリ情報
第1のデータ処理プログラム 図9に示すフローチャートのステップに対応する プログラムコード群
第2のデータ処理プログラム 図10に示すフローチャートのステップに対応する プログラムコード群
第3のデータ処理プログラム 図11に示すフローチャートのステップに対応する プログラムコード群

記憶媒体のメモリマップ

[Drawing 9]



[Drawing 10]



[Drawing 12]

